

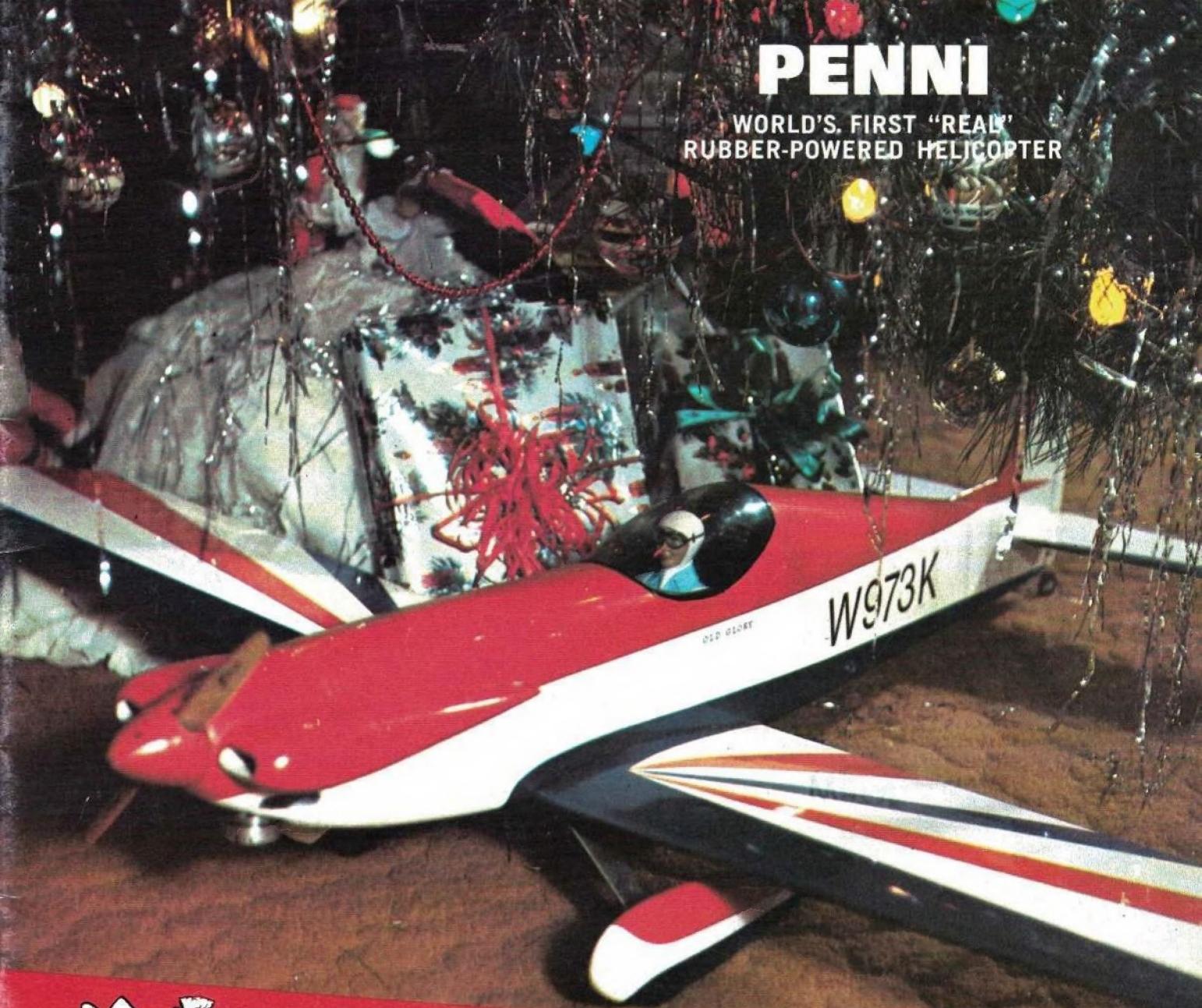
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JANUARY 1970

AMERICAN aircraft modeler

PENNI

WORLD'S FIRST "REAL"
RUBBER-POWERED HELICOPTER



A wayout Tenderfoot project

How to build a FLYING SAUCER

WW-1 SOPWITH CAMEL

FULL-COLOR CENTERSPREAD



UNDONE



Assembled

Range

OS radio gear has good range for one reason. They use a potent high powered transmitter. OS sets have transmitter configurations that employ approximately 12 volt power supply. In the case of the 3 Ch. and the 6 Ch., the nickel cadmium batteries are built into the transmitter with the necessary charging equipment to charge both the transmitter and receiver. On the economy 2 Ch., the nickel cadmium batteries are supplied with the receiver; however, the transmitter uses eight pen cells. The OS receiver is an all silicon design incorporating some of the latest AGC ideas to keep the sets from overloading when the transmitter is close to the airplane.

Quality

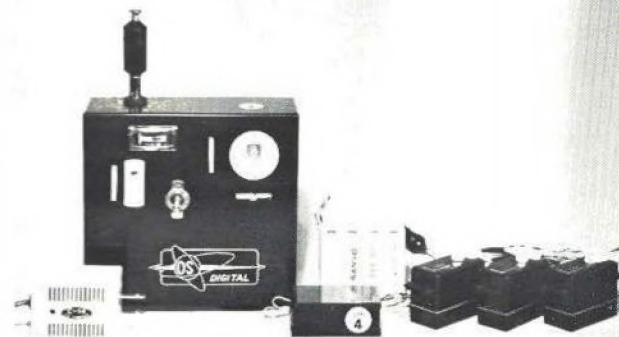
OS is Japan's oldest and largest model airplane engine manufacturer. OS has been building radio equipment since 1954 which certainly establishes them as Japan's pioneer R/C equipment manufacturer. The quality features found in OS sets include leatherette transmitter covers on the 3 Ch. and 6 Ch. rigs, fully collapsing antennas with nice loading coils, a beautiful stick assembly. Ask your dealer about these sets and look over the quality features for yourself.

Service

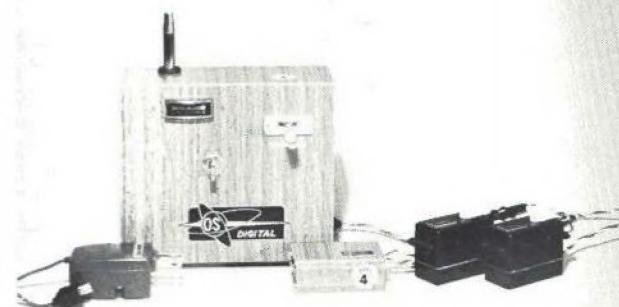
OS in the United States is serviced by World Engines, Inc. We also have supplied our Service Experts with diagrams on OS equipment. See our Service Experts ad in January Model Airplane News.



6 Channel with 4 (SP260) Servos \$335.00



3 Channel with 3 (SP252) Servos \$199.98



2 Channel with 2 (SP252) Servos \$139.98



WORLD ENGINES

INCORPORATED
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CINCINNATI, OHIO 45236

IS MONOKOTE REALLY MORE EXPENSIVE?

We, at Top Flite, are so convinced of MonoKote's superiority over the silk and dope method of covering and finishing, that we find it difficult to understand why every model builder doesn't cover his plane with MonoKote. Therefore, we hired a research organization to find the answer.

Over 800 model builders and dealers were questioned, and the results of the study indicated that the only reason more builders weren't switching to MonoKote was its "presumed high cost." The majority of those builders who objected to the cost, however, had never used the product. Many of the dealers, on the other hand, expressed the opposite point of view. They indicated that economy was one of MonoKote's major benefits.

LET'S LOOK AT THE COST FACTS!

A typical example of comparative costs came from Mr. Al Fuchsen, owner of Al's Hobby Shop—129 W. First Street, Elmhurst, Illinois. To compare the cost of MonoKote with an equivalent covering and finish using silk and dope, Al selected an average size plane, Top Flite's TOP DAWG. He explained his reason for selecting this plane, "if there is a cost difference, the larger the plane, the greater the spread."



MATERIALS NEEDED TO COVER THE TOP DAWG WITH SILK & DOPE

1/2 Pint Filler Coat**	1.00
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1 Pint Color Dope*	1.65
1 Pint Thinner *	1.35
1/2 Pint Trim Color*	1.00
2 ft. Silk @ \$1.79/yd.	3.58
Sandpaper	.15
Masking Tape	.25

Also needed: brushes, trim decals, rubbing compound, wax, etc.

*Based on quart size prices

**Based on pint size prices

\$10.63

MATERIALS NEEDED TO COVER THE TOP DAWG WITH SUPER MONOKOTE

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\$8.99

CONCLUSION:

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COVER PHOTO: A modeler's idea of a perfect Christmas morn is pictured by photographer Frank Pierce who had to buy a live tree last summer. The model is an Aeolus. And a very merry Christmas to you, too.

WILLIAM J. WINTER — PUBLISHER

Edward C. Sweeney, Jr., Editor

Sally Barry, Managing Editor

VOLUME 70, NUMBER 1

JANUARY 1970

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STRAIGHT...**...AND LEVEL**

It has been recommended we fly the FAI R/C rules to improve future team capability. The concept is dangerous.

IN Bremen this summer, there began a belief—now a campaign—that R/C Pattern in this country should be flown by FAI, not AMA, rules. This has got nothing to do with who makes rules. It is simply that the American team members saw first hand that competition-grade flying has made spectacular strides in Europe. The message is, that, unless we live and think FAI rules and flying, we could do worse in the future. FAI rules and maneuvers are different, and you know what practice it takes to stay on top of the heap.

At the Southeastern Trade Show, in Atlanta, during which the Tournament of Champions took place (see AMA's Flash News page in the December issue), a petition was circulated by those who wished to fly FAI rules in future American Contests. The magazines will be quick to climb aboard a news-making issue like this one. The concept may be strongly recommended. Experience cries out to be careful.

The writer has been through this spooky FAI-AMA grind before.

You don't have to be much of an old-timer to remember the civil war which erupted in the late fifties when the rule voting—rules were popularly voted for in those days—decreed that we all would fly FAI-type free-flights in domestic competition.

There is a side-aspect to this business, which is that magazines wield tremendous influence with the public. An idea may be good, or bad, its proponent a champion or merely a soothsayer in love with his own voice. But the impact of printed words can scramble the brains of previously mild-mannered guys who hear nothing but the ball-park bugle which calls charge.

In 1951, your publisher, then editor of another magazine, believed that the Wakefielders' stranglehold on America's international thinking blinded us to the existence of "Power," or free-flight. With tongue in cheek, we proposed in an editorial, that Wakefield models be powered by interchangeable gas and rubber for dual events. The idea was nutty, and it was supposed to be. What some of those guys said! But we got into power—obviously not by sticking a gas engine on a Wakefield.

An FAI free-flight model is a different breed of cat—some R/Cers think an FAI plane also is something special—and the Europeans made the vaunted U.S. free-fighters look rather silly. So what was more natural than an editorial stating that we should all fly FAI in the best interests of the good old U.S. of A. When tens of thousands of people read a thing like that—and it did make sense—AMA feels like a chick-

en house downstream in the Johnstown Flood. The proposal went on the ballot and passed.

Now it so happened that out West they liked big, drifting free-flights which could ride those giant thermals over miles and miles of space (and where did that go to?). Easterners quickly found themselves cast as sinister plotters who would inflict small-field FAI bombs on a free country and never did dig who did what to whom. Petitions were circulated. The Coast threatened to tear AMA asunder. Phones rang coast to coast. The election, if not rigged, was a farce, it was felt.

Perhaps 10% of the members had, by a squeaker, imposed a new deal on the other 90% who did not care a hoot about voting for anything, even a president, until the results displeased them. Other stand-up-and-be-counted areas bought every wild charge, lock, stock and barrel. AMA split down the middle. Having got the country into a state of madness through reasoned printed words, we somehow had to put the pieces back together again.

This will shock you older free fighters, but the truth of the matter was, that careful investigation revealed the curious nature of so-called western resistance. The northern district of California actually had voted in favor of FAI rules. The southern portion, far from being united in a holy cause, had by a narrow margin favored AMA rules. But even if it appeared that a few had led the many on a children's crusade, the AMA remained faced with a sticky ultimatum.

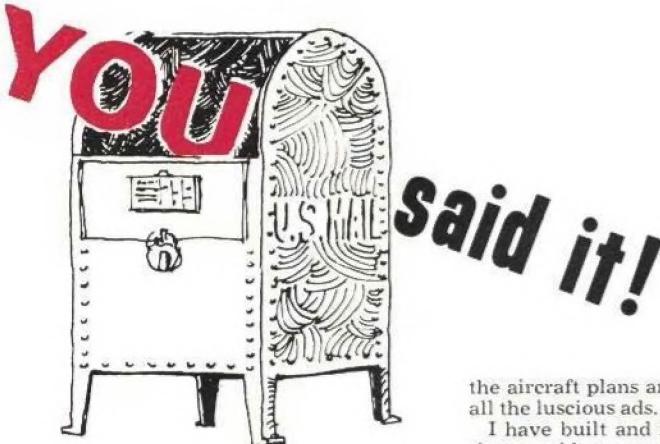
It fell to us to get the free fighters out of Vietnam, so to speak. The method of popular voting on rules, recognized guys who could be sport flyers, U-controllers, indoor men, anything. We voted on "everything," and by the zaniest of multiple choice things. This was because all proposals were legit. The need for constitutional changes was pointed out. A study committee—it happened to be loaded with calmer-thinking west coasters—proposed a good, new constitution. Basically, it is the one that governs us today.

It should be noted that FAI free flight came into its own anyway. The United States did well in International competition. We don't always win—but should we expect to?

On this new proposal to fly FAI rules in R/C competition—if that is what we really are thinking about—the FAI F/F debacle proved that there are more ways than one of skinning a cat.

Caution—that's all!

—The Publisher



It's tough at 30 knots

Our AMA club has been flying at the local school grounds, and never had trouble with anyone, with the exception of a local soccer league.

The local modelers have been asking for a flying field for several years, and at last, the city has proposed to put one in. We feel that we are lucky to get this, but the plan for the site is ridiculous.

It is placed by the bay, where the wind gusts at over 30 mph in the afternoon, and right in the middle of the motorcycle track. The site is over six miles from downtown, and more from several residential areas. Our club is almost totally juniors, so we just don't have transportation to get out there. And if we did get out there, it is pretty hard to fly in 30 knots. Other than that, our club is doing fine.

We've flown everything, and one 15-year-old is even getting a four-channel radio. Keep up the good work in your magazine.

Scott A. Conradson, President, Palo Alto Airmasters, Palo Alto, Calif.

That green stuff

I've been reading your excellent magazine, and I enjoy it very much. I especially enjoy the "You Said It."

I would now like to comment on Captain Benshoff's letter (July '69) describing what he calls kids' major problems in modeling. Although I can't speak with much authority on R/C, I think the problems are universal in modeling. He recognizes the two major problems, but in the wrong order.

I have been building models for half my life (7 years), and I would hope to have picked up some skill and patience, which he gives as our (kids) major problem. The real problem is the long green stuff (money). I babysit and mow lawns and still have trouble affording C/L, much less R/C.

Could you please publish more plans for 049 to 099 planes. Also, where can I get scale plans for WW II fighters with a 20" to 30" wingspan?

Craig Margulis, St. Louis, Mo.

Scale plans appear in numerous magazines. Back issue stores and supply houses are good sources of rubber and gas-powered F/F and C/L craft. Plan services—including Sudden Service Plans—may list items. Hobby Helpers has a 15-cent catalogue of older designs which appeared in AAM. The English magazine Aeromodeller is noted for numerous scale subjects.

—Publisher.

From Puerto Rico

I've been building and flying model aircraft for about two years, and I think that your magazine is terrific. I really enjoy Bjorn Karlstrom's color centerspreads, all

the aircraft plans and photos, and of course, all the luscious ads.

I have built and flown several stick-and-tissue rubber-powered planes and quite a few control-line planes, both balsa and plastic. I am ready to get into R/C, even though I don't have much extra money at my disposal.

I do have some problems here in Puerto Rico when it comes to flying my control-line models. For example, there are no approved flying fields. I have to fly my planes in a store parking lot early in the morning before the store opens, or on Sundays. Or, I can fly off a narrow sidewalk in the middle of a muddy field or gravel. Of course, I then run the risk of having the model run off the edge of the sidewalk before it leaves the ground. The models always crash-land in the mud and gravel, and usually do a couple cartwheels on their wings in the process. In such a field, the pilot is in constant danger of tripping on the slippery gravel. And if the pilot hits the ground, you can imagine how much harder the airplane does.

Every so often a tough kid comes around with a small gang of thugs, and then I have to either cut the control cables and run, or start the aircraft's engine to scare them off. Otherwise they either take the model by force, or run into the flight circle during the flight and have fun with the plane and the lines, jumping over them or ducking under them, depending upon the altitude of the model.

I know of the ignorance and stupidity of some of my acquaintances when it comes to models, like gluing the engine to the firewall, starting up a control-line model

(plastic) with the thought of preparing the cables while it is running. And last but not least, letting go the control handle during flight. I'd like it if readers would tell you about similar occurrences—perhaps write an article in AAM including some of them. All the "old modelers" would get a kick out of them, and it might prevent some beginners from making similar mistakes.

I'm fourteen.

Peter Crommett, Bayamon, Puerto Rico

Just a couple of things

I like your magazine very much, but would like to make two small requests. First, please print a drawing of the P-51 and similar WW II drawings by Bjorn Karlstrom.

Second, please print articles pertaining to (for example) the Wright Brothers or Eddie Rickenbacker.

Joseph Graziano, Bergenfield, N. J.

Congratulations Tenderfoot winners

Just received the Nov. '69 issue, and it is the best yet! Congratulations to the entire staff.

Greatly enjoyed seeing the results of the Tenderfoot "Flying Funique" contest.

On behalf of Ken Sykora and myself, congratulations to all the participants in the Tenderfoot contest. The winners exhibited productive imaginations, and we hope that they will continue to apply their creativity toward future aeromodeling endeavors.

Bill Hannan, Escondido, Calif.

Many thanks

I am very sorry the NAR decided to discontinue its publication in your magazine. I feel that you are certainly the best magazine published on the subject of modeling. Therefore, I am now eagerly renewing my subscription to AAM.

I would like you to publish as many rock-et plans as possible.

Mark Schaal, Annapolis, Md.

Is there a solution?

In the Sept. '69 issue, the first line of Straight and Level says it! "A free-flight model is always a gas-engined design. . . ." Deep back in my mind I've never been able to think any other way. We're like the millions who still think all picture-taking cameras are "Kodaks."



"DARN IT, I TOLD YOU TO KEEP YOUR FINGERS OUT OF THE COCKPIT !!!"

We in the Denver area have three or four good clubs (as far as free-flight is known today), and probably 50 to 100 model-builders that may enter contests. Except for the AAA contests, it is not uncommon to find many, of the many events, with less entrants than there are trophies. Sometimes this happens in the AAA too.

Today, there are so many types of planes, then these are broken down to sizes, etc. Seems as though there are hundreds of events during the contest year. Each "clique" (bless them because they are the modelers with real spirit) tries to draw competitors from other events. And so the see-saw goes: changing interest, promoting new events, until we finally end up with many dollars spent promoting a contest with little or no competition in each event to stimulate further interest or desire to come back again.

So in a way, I've switched back to the "old-timers," but it looks like they are heading the same way—many planes but all different classes.

Al White, Denver, Colo.

For jangled nerves

Still really believe one of the overall problems with most things today is the complete indifference of people and a very big gap in communications. It really bugs me at the status of most things and the lack of respect for the other guy.

Seems the thought is take what you want, do what you want and to hell with the other person. The only peace I feel is when I'm out flying models or kites.

My recent chatter with a couple of friends reveals that they think radio-control has gotten too technical. One man has gone back to single-channel gear and the fun he once knew.

If the nerves are jangled, don't take a tranquilizer, just go fly a kite.

Clif Osburne, Chillicothe, Ohio

Seeks info on Nieuport 11s

Do you have any back issues for sale? If so, do any of them contain information on Nieuport 11s?

In my first issue, Aug. '69, under the article "National Plane and Space Model Show," your magazine had an excellent picture of a Nieuport 11 built by George Tychan from a VK model kit. If you have any information on this type of plane, please inform me.

The 1918 S.E. 5a centerspread was spectacular. Also, when I collect enough money, I will start R/C flying. I plan on buying my equipment from *American Aircraft Modeler* ads. If possible, my first R/C airplane will be a VK Nieuport 11 from your ad.

I have owned a ready-to-fly airplane for four years and had not started it since the first time four years ago. I read "Gentlemen Start Your Engines," for the Tenderfoot, and now it purrs like a cat.

John Bowen, Oakfield, N. Y.

From time to time we advertise what back issues we have. All plans recently published are listed under the Sudden Service Plans. Previous AAM designs, may be researched via the Hobby Helpers Catalogue, 15 cents. — Publisher.

A special award?

I am very interested in knowing whether or not there is a special award for a person who can take off and fly to a certain altitude, then return without mechanical or outside power, engine, etc.

For information only, please define the words mechanical or outside power. Also please keep this quiet until my experiments are proven, otherwise I'll have many people wanting to see and possibly infringe on my idea.

Robert L. Jones, Miramar, Fla.
Continued on page 74



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ON THE SCENE

Rhinebeck 1969

Annual WW I scale meet featured mock-combat, strafing missions, and balloon busting at Cole Palen's great aerodrome.

PHOTO STORY BY JIM LEGGETT

ON Saturday and Sunday, September 13 and 14, the third annual World War I Jamboree at Rhinebeck, sponsored by the Poughkeepsie IBM Radio Control Club, was staged at Cole Palen's Old Rhinebeck Aerodrome.

It could just as well have been mid-July. The windsock hardly fluttered all weekend, and the sun constantly stared down from an azure sky.

On Saturday morning over 50 contestants, hailing from all over the U. S. and Canada, had signed up for the well-organized events. Many more arrived on Sunday. Saturday's crowd of spectators was a mere fragment of the estimated 3,000 who flocked to the Aerodrome on Sunday, thanks to WTEN Television in Albany, N. Y., who reported the action at the airstrip on their Saturday night news. Cameramen from National Educational Television in Schenectady were on location both days filming much of the fast moving action.

In the shadow of genuine full-size World War I planes, the R/C modelers sent off their machines into the blue for a spell-binding series of fly-bys, precision maneuvers and, most of the time, smooth landings.

Aviators Cole Palen, Dave Fox and Dick King were recruited to judge the breathtaking dog-fights featured each afternoon.

Plans are already underway for next year's Jamboree at the same location. It will certainly be a smashing success.

Ole Rhinebeck Aerodrome is a narrow, rough dirt and grass strip lined with trees. For the meet the Fokkers, Moth, Waco, Bleriot, Sopwith, and other antique planes lined the runway. An antique car club showed off their Model T Fords.



Bob Dean flew Enya 60-powered Fokker D-VII from Sterling kit. It weighs 6½ lbs.



Handsome Morane Saulnier Parasol flown by Nick Ziroli scaled from AAM centerspread.



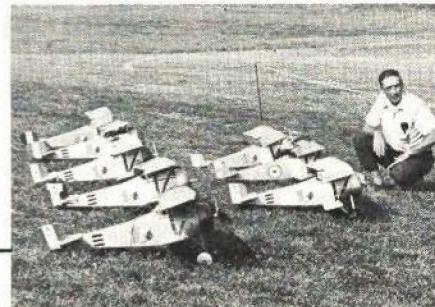
Leon Shulman's speedy little Nieuport swoops in for a landing during Dog Fight. We wonder if he saw the Red Baron then wisely decided to land and seek cover?



Here's what Leon's pilot thought of the hasty landing, or was it the smell of castor?

Dick Allen's immaculate Sopwith Pup flies past. Bill King's real Pup was there too.

An unusual entry, the scratch-built antique Blackburn by Dick Spring. Lots of wheels.



Vern Krehbiel admires a squadron of nearly identical Nieuports made from his kits.



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3. Two Channels, Rudder and Elevator
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Skylark 56 Shown

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JR. SKYLARK \$695

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Span 37" Area 235 sq. in.
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For Single Engine Use .09
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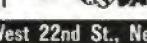
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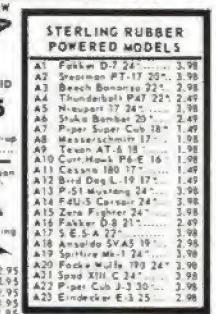
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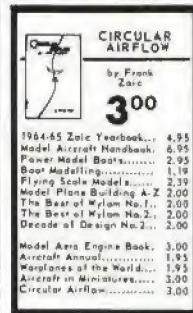


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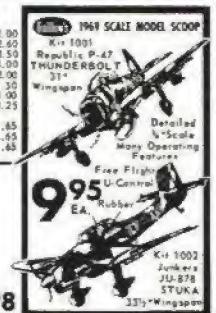
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BEGINNERS MUSTANG
195



195



195



195



195



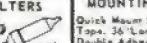
FLY BY NIGHT KIT
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801
+ 50KUP
+ 20
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175



175



175



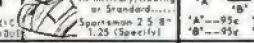
175



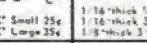
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15 COMPLETE SHEETS
SIZE 21" X 24"
\$4.50 VALUE
98



98



98



98



98



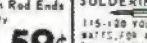
COVERING MATERIAL
98c
Color White, Red,
Yellow, Green - Per Yard
Silk White, Red, Gold, Blue,
Pink, Turquoise, Orange, Black,
Green Silver



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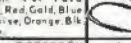
5.49



5.49



5.49



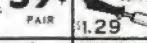
ACCESSORY MODEL A
99c
100 PIECE
WHAT A BARGAIN! PILOT
HEADS, CANDLES, 1 1/4" -
PLASTIC SPINNING INSTRU-
MENTS, PLASTIC PLATES,
INSIGHT DECALS, ETC.



4.49



4.49



7.77



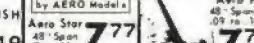
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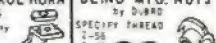
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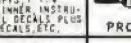
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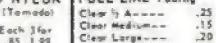
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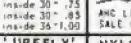
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2.25



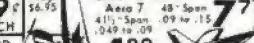
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30" Span for .010-.020



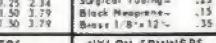
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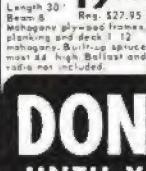
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9.85



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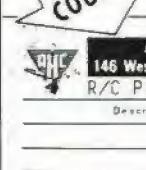
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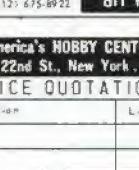
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SAUCERER

A simple-to-build and fly model that is different.

RAY MALMSTROM

FLYING fun comes in all shapes and sizes, and it certainly will be yours, if you circulate with this circular-shaped space-age flavored flying saucer.

Construction: Cement together $\frac{1}{4}$ " balsa sheet cut to the dimensions in Fig. 1. Draw a center line across the sheets, and with a pair of compasses draw an 11" diameter circle. From the plan, trace and transfer to the circle the angled cutout for the motor mount, the elevator line and the small square that will accommodate the bellcrank mount D. Using a fretsaw, cut out the disc (Fig. 2). Bevel the edges with fine sandpaper. Cut the elevator apart and rejoin using nylon or silk hinges. Cut a small slot in the elevator where shown for the control horn. Cut the body from $\frac{1}{4}$ " sheet. Note that it is tapered (use sandpaper on a block for this) towards the rear. The rear of the fin is cut away and recemented back at an angle (Fig. 3).

Now cement body piece along top centerline of disc. Cut hose blocks A, B and C from block balsa. Shape with knife and sandpaper and cement in position. Gouge out recesses for bolt heads (Fig. 4). Cut engine mount from $\frac{1}{4}$ " plywood, and drill holes to suit the engine you intend to use. Insert mounting bolts from the back, and solder pieces of wire across the heads to prevent them from turning (Fig. 5). Firmly cement the engine mount into the cutout on the disc and against the face of blocks A, B and C. Make a really firm job of this, and see the engine mount points the correct amount to the right.

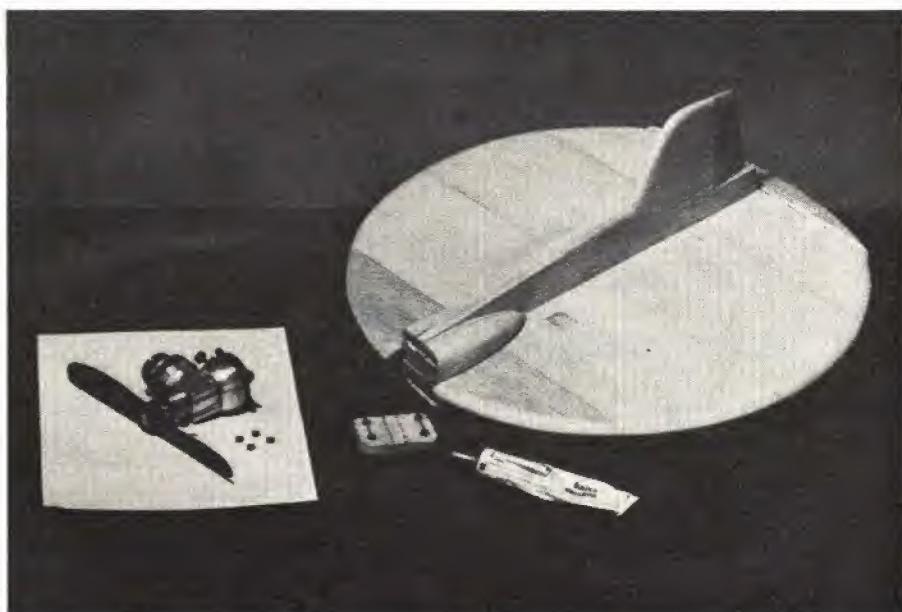
Cut a bellcrank from $\frac{1}{16}$ " ply (or use a metal or plastic commercial bellcrank of similar size), and bellcrank mount D from $\frac{1}{4}$ " ply. Drill D to accept to bolt, and make sure it is a tight fit. This is important. Cut control rod, and leadout wires overlength at this stage and assemble to bellcrank, bending as shown (Fig. 6). Pass the bolt through the central hole in the bellcrank, slip on a washer or two (Fig. 7), and screw firmly into part D. The bellcrank mount (complete with bellcrank and wires) is firmly cemented into the square recess already cut in the disc (Fig. 8). Make the line guide, drill holes, and slip it onto the leadout wires and cement to the undersurface of the disc in the position shown. Do not yet form the hooks on the leadout wires.

Cement the $\frac{1}{16}$ ply horn into the elevator slot firmly. Use plenty of cement. Connect

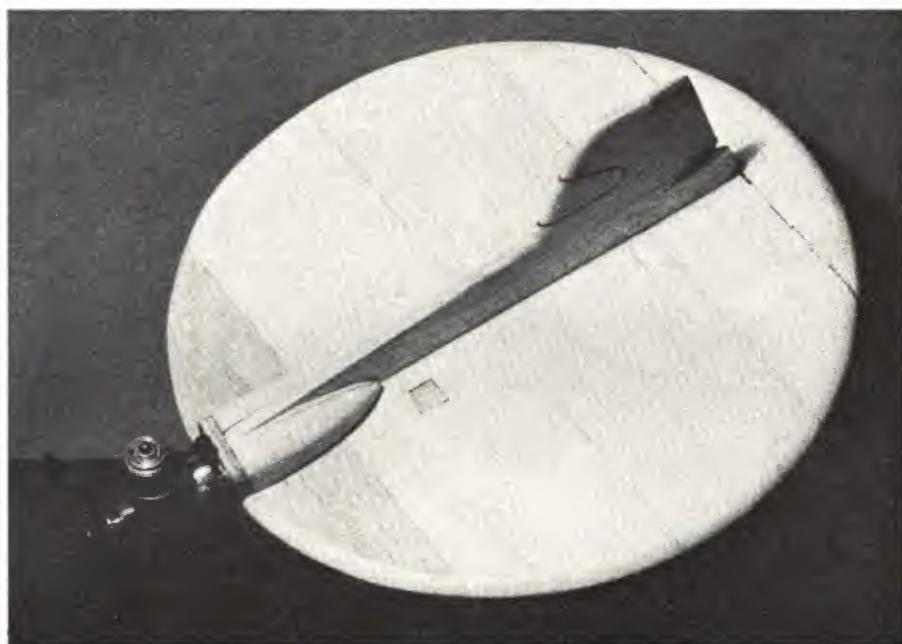
MATERIALS LIST

Three $\frac{1}{4} \times 3 \times 36$ balsa, one $\frac{1}{4} \times 3 \times 20$, one $1 \times 6 \times 1$, one $2 \times 2\frac{1}{4} \times \frac{3}{4}$, one $\frac{1}{4} \times 2 \times 2$ plywood, one $\frac{1}{16} \times 2\frac{1}{2} \times 1\frac{1}{2}$, one $\frac{1}{32} \times 2\frac{1}{2} \times \frac{1}{2}$, one 9" length $\frac{1}{16}$ music wire, one 14" length $\frac{1}{32}$ music wire.

Saucer is lively sport ship for learning to fly upside down, loops, and wingovers. Being almost unbreakable, it is a fine confidence builder. It uses 049 engine.



Full-size plans on next two pages include many helpful building sketches. Plane is mostly $\frac{1}{4}$ " sheet balsa. No airfoil, as such, is carved, but bevel wing edges.



Before painting, sand model all over with fine sandpaper. Blow off dust and brush on several coats clear dope. Use extra fine sandpaper between coats, then trim with color.

control rod by bending the end and slipping through the hole in the control horn and locking with a soldered washer (Fig. 9). Be sure the bellcrank is in the position shown on the plan and the elevator is in the neutral (flat)

when you connect up. Now cut off the excess from the leadout wires and bend the hooks. The hooks should be level (as shown on the plan) when the elevator is in the neutral (flat). *Continued on page 62*

Top (Block A)

Side (Block A)

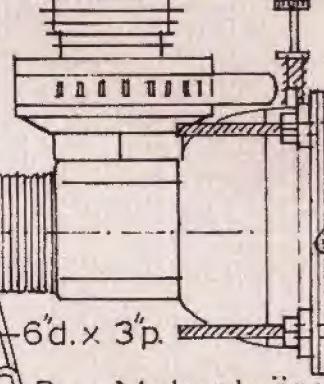
Top (Block B)

Side (Block B)

Top (Block C)

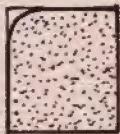
Side (Block C)

Cox-049
'QZ" engine
shown



Ray Malmström

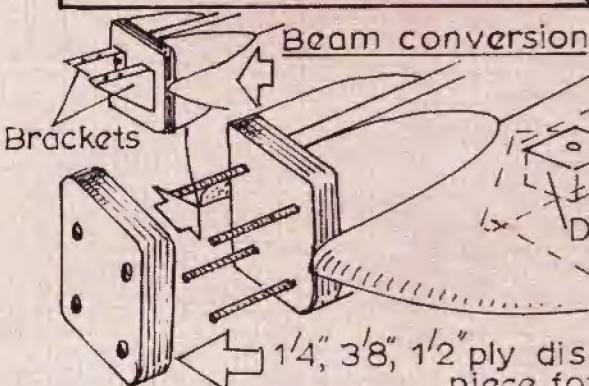
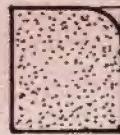
Front (Block A)



Cut

recesses
for screw
heads

Front (Block B)



Beam conversion

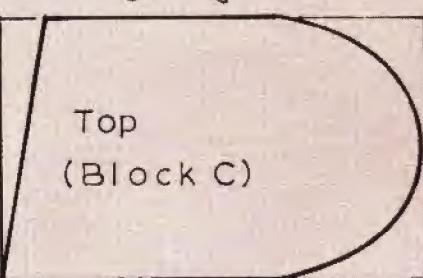
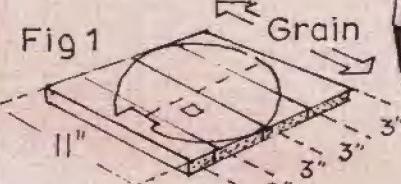


Fig 1



Front (Block C)

BALANCE POINT

B

C

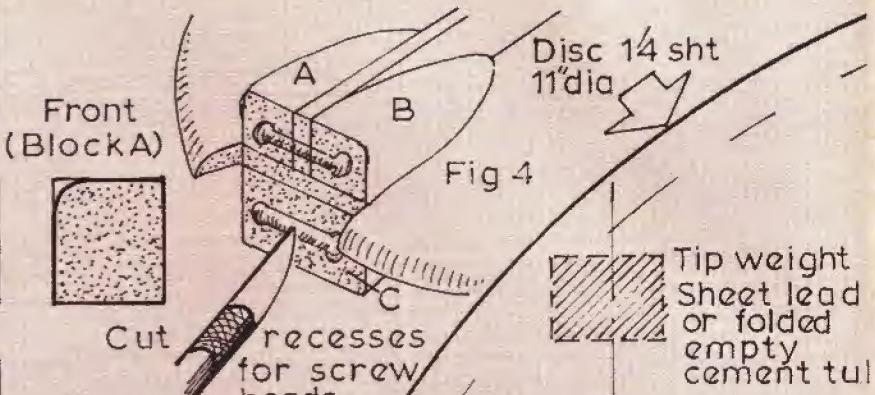


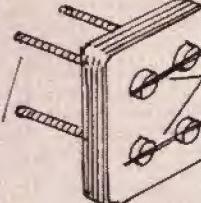
Fig 4

Tip weight
Sheet lead
or folded
empty
cement tube

1/4 ply



Fig 5



Wire
soldered
across screw
heads

A

B

Sheet join

Fig 2



Lead
wire

Body
(Heavy)

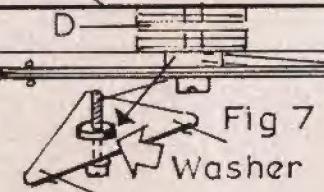
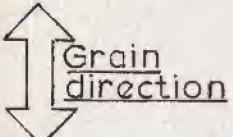


Fig 7
Washer

ALL PARTS
SHOWN
FULL SIZE



Sheet join

Bevel disc to this line

Line guide



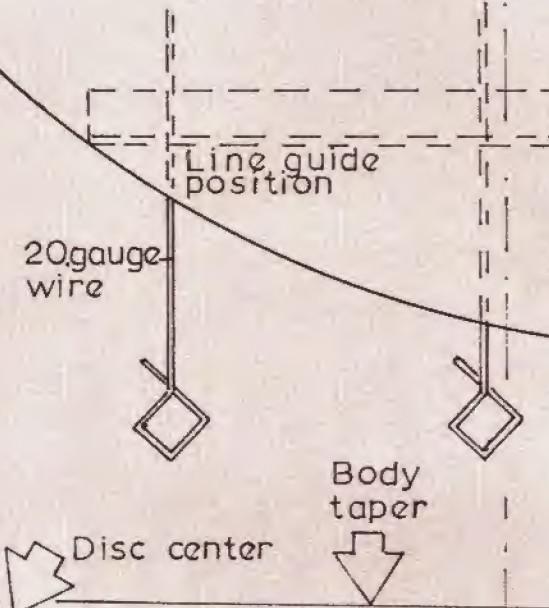
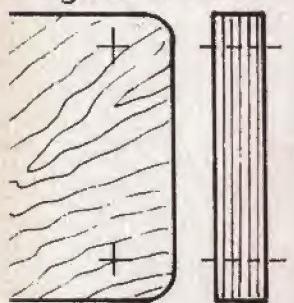
Laminated 1/32ply and 1/4 sht

Bellcrank 1/16ply

D
1/4 ply



engine mount



Round-off edges

Paint black

Cut

1 out
es

FINISH
Entire model: 2 coats
clear dope. Colour
trim with enamel
paint. 1 coat fuel proofer.
Sheet join

1/4 sht
outline)

Control horn 1/16 ply

18.gauge
wire

Silk or
nylon
hinges

Cut

Elevator

Control
horn slot

Fig 3

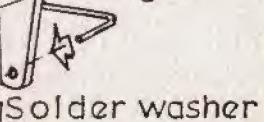
Rear
off fin
offset

Sheet join

POWER
Cox .049 group
and diesel and
glo-motors
.049-1cc.

LINES
30ft. fine
gauge steel
wire. Fly
over long or
soft grass.

Fig. 9.





Rockford is watching owner of OX-5 powered Waco fix inevitable stuck valve. Engine probably in better shape now than when new.



The 1925 De Havilland Gypsy Moth (plus tail wheel) with 90 dubious horses, no brakes, but lots of wings, taxies by. Notice the wing slats at leading edge of top wing. With a strong puff of wind it would be flying. Study in slow motion?



A favorite trick, the inverted ribbon cut. Here Bill Lumley does it with his colorful De Havilland Chipmunk. Aerobatics, of all types, are becoming more and more popular.



EAA Pres. Paul Probereznay, in only remaining P-64. High power and fantastic climb rate allow slow roll on takeoff while retracting gear and flaps. By North American.

See for yourself! There are really 527 aircraft parked here, count 'em. Planes are parked by groups, warplanes, antiques, Miniplanes, Stits, Thorps, and originals.



The 17th Annual Fly-In of the Experimental Aircraft Association produced 527 homebuilts and antiques—and 600,000 spectators to enjoy the world's largest aviation meeting.

Photos and story / **DON PRATT**

IN the absolute early morning stillness of July 25, only a curious ground squirrel surveys the peaceful flying field at Rockford. But in a matter of hours, the world at Rockford will go mad, slowly at first as workmen appear, then faster and faster into an incredible crescendo of airplanes, people, and the constant din of roaring motors. The Rockford Experimental Aircraft Association Sport Aviation Convention is soon to begin.

Lasting for seven days, from July 27 through August 2, "Rockford," as it is known simply to the flying fraternity, is mecca each year during the last week of July. Since 1956 it has been the biggest aviation meeting in the world.

This year over 600,000 people came to view 527 homebuilt and antique airplanes. Transient, modern factory-built airplanes (Spam cans) flew in by the thousands and the Greater Rockford tower recorded 34,000 takeoffs and landings during that one week!

The Convention is truly international in character. In 1969 E.A.A. members from



These guys know a good thing; all have nearly identical Pitts specials. Gene Soucey, Marion Cole, and Bob Huer fly as the "Red Devils" aerobatic team. Takeoff features one rolling to inverted, and others closing in tight Blue Angels-type formation for climb-out. Act is concluded with three simultaneous Lomcievak's.

Modernized Demoiselle really flies, but slowly. Has 65 hp Continental with ailerons instead of wing warping for lateral control. It has all-flying/movable tail assembly.

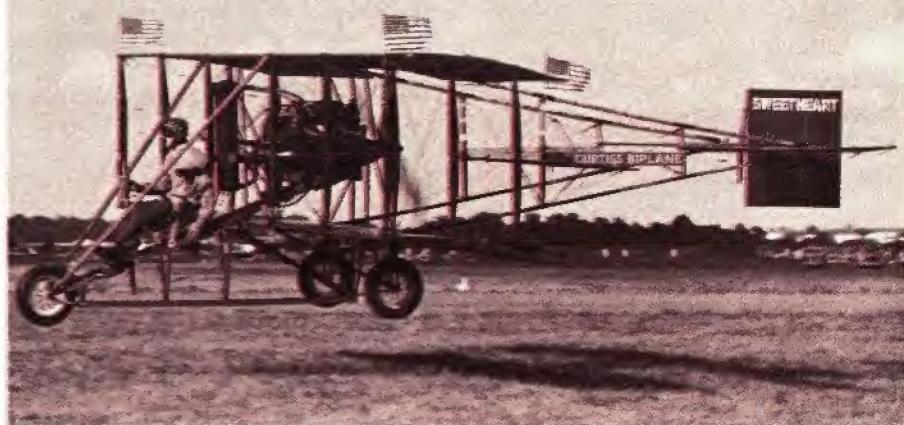


Replica of 1909 Santos-Dumont "Demoiselle" is very close to original. Two-cylinder engine and bamboo pole structure. It flies?

Each summer, Dale Crites brings 1912 original Curtiss Pusher out for exercise. It is only "improved" for safety.

Canada, England, Belgium, Holland, Germany, South Africa, New Zealand, Australia, Okinawa, and many other countries made the pilgrimage.

It all started in 1953 when a group of sport flying enthusiasts, mostly from the Milwaukee area, formed the Experimental Aircraft Association. Their leader was a big jovial Wisconsin Air National Guard officer named Paul Poberezny. Their purpose was to convince the CAA (now FAA) that restrictions against the building and flying of homebuilt airplanes should be lifted. They succeeded. E.A.A.'s very first national fly-in convention was held that year at Milwaukee. Eight airplanes showed up. About twice that num-



ber of people sat beneath the wings of their airplanes for two days and swapped stories and building ideas and never dreamed of the Rockford of today.

Rockford is a great show. One who remembers the National Air Races at Cleveland years ago sees that Rockford has surpassed that classic of yesteryear. But Rockford is much more than that. It is different things to different people. It is one thing to the homebuilder, another to the modeler, something else to the antique airplane fancier. It attracts photo collectors, would-be airplane designers, and the owner too busy to build his own.

It is called a convention but it's like the World's Fair, the Indianapolis 500, the Kentucky Derby and a Barnum and Bailey circus with a hundred rings all going at once.

It is walking through acres and acres of parked flying machines of every size, power, color and configuration. It's strolling through warehouse-size tents where parts, materials, components, and blueprint suppliers are showing their wares. It's wandering through a campground with fence-to-fence tents and camp trailers equal to the population of a small city.

It is that beautiful Waco cabin biplane glistening in the sunlight waiting for you to shoot the pictures you need for proof-of-scale on the model you are building up for the next contest.

Rockford is a ride in "Breezy" with Carl Unger, or a fast trip around the pattern with Leon Davis in his quick and dainty DA-2A. It's watching the airplanes in the fly-bys where a Wittman Tailwind patters above the runway at 160 mph, followed far behind by a 1909 Santos Dumont Demoiselle and a 1912 Curtiss Pusher in formation at a break-neck pace of 45 mph.

Rockford is the Warbirds passing in review. In silent rapture you watch and listen. There are no sights or sounds that rival that of an F-51 Mustang or a P-38 or P-63 at 350 mph flying just the diameter of a propeller above the runway.

It is aerobatics. The showplace of the art. Rockford also is watching Marion Cole, Bob Heur and Gene Soucy in a formation of three red Pitts Specials, with smoke streaming, going faultlessly through the pinwheel loop and finishing their act with the three tiny biplanes in unison performing the famous Lomcievak forward somersault. It is watching Bob Lyjak in his 1931 Taper-wing Waco doing an inside-outside snaproll (you fullhouse radio boys try that one). It is watching Duane Cole in his 90-hp clipped-wing Taylorcraft going through an outside square loop and making it look so deceptively simple.

Rockford is seminars on the building and designing of airplanes. Awards and hi-jinks in the big meeting tent each night. Peanuts, popcorn, cotton candy and souvenirs and pennants. Little impromptu parties in the tents on the campgrounds and in the halls of the city's motels each night. You might hear a history professor of Polish extraction turned aerobatic performer, strum a guitar and sing "That Wild Colonial Boy" in an authentic Gaelic brogue, or see a TWA captain of Boeing 727's who pilots a midget biplane for fun, turn his E.A.A. cap around backwards, and announce that he is going to "take'er up to twenty fathoms."

"Rockford" is all there because a guy named Poberezny started it 17 years ago and has stuck with it ever since. He is the "Chief" to the 44,000 member Experimental Aircraft Association, and the guiding light to thousands of other sport pilots who stand with him in spirit. He runs the E.A.A., and that alone is a leviathan task. But during the Rockford convention he must surely be the most maligned, loved, used, misused, and abused person on the face of this earth.

There will be a Rockford Convention in 1970, same time, same place. If you can swing it you ought to go.



Spinks "Acromaster" is Charlie Hillard's mount for next World Championships. Looks like model plane, has symmetrical wing. It will be featured in up-coming AAM issue.

This Bensen-type Gyrocopter has burnished aluminum pilot enclosure for comfortable long flights. O&R motor used to get rotor up to rpm — for takeoff only.



Bob Bushby's simply gorgeous two-place Midget Mustang. It is fast, clean, hot on landing, and a bit like a racer, but very stable. Tip tanks are new feature.



Leonard Eaves' "Skeeter" is another effort at simplicity, and surprisingly, these "simple" designs are quite fast. It has welded-tube fuselage with all-sheet-metal wings.



Volmer Jensen design is go-anywhere amphib. of which many are flying and being built. It is light weight, all wood and fabric. Power usually converted GPU's of 125 hp.

With wing of fiberglass sections on aluminum tube spar and erector-set-type fuselage bolted together, Jim Bede's new design may just reinvent sport aviation.





A fly-in could not be for real without some Pete Bower's "Fly Babys." This all-wood plane is a favorite. Builds like model plane, flies slow and stable on little power. This one is Canadian.



Tracy Pilur, one of many girl pilots, arrives each year with "The Pretty Purple Puddy Cat," gaily painted Smith Mini-plane she built herself. Note famous mascot sitting on wing.

The increasingly popular Thorp Tiger. It features all-metal construction, simplified no-compound-curves structure. Most use the 125-hp Lycoming engine and go over 150 mph—that's fast.



Original biplane by Adolph Hugo is tiny, light, and quick. Interesting features are single diagonal strut instead of wire bracing for the wings and Whitman-type landing gear.



Leeon Davis is always giving rides in his DA-2A, popularly called the "Baby Bonanza." Outstanding design is fast and yet docile. All-metal bird has lifting fuselage shape and all-flying tail.



Latest Pitts design is called "Big Hickey," of all things. It looks larger than most home-builds and ought to be a great cross-country plane. Wing-tip tanks seem to make wing more efficient too.

Pazmany PZL-1 was one of the early all-metal home-builds and one of the only ones to be designed for standard class certification. It is unusually strong although structurally a bit complicated.



Tony Spezio's award-winning sport design taking off. This "two-holer" appears to incorporate features of many other designs. It has wood wings and steel tube fuselage with fabric covering.



Undone

*DRIVEN, BUT, DOWN BY
BILL HEBB STREET
WRITTEN BY
MONTY GROVES*



UNDONE 1

Hottest thing in R/C pattern, was winner of several events at recent West Coast Championships.

BILL HEBESTREIT

THE *Undone 1* germinated in my mind for years, but I never got around to getting it on paper. Then two wipe-outs on successive weekends — groan, nothing to fly — dictated a crash program of design and construction.

Using a semi-scientific approach, I took the moments, areas and weights for the Kwik Fli, Bar Fli, Henchman and Sportmaster and plotted them with respect to CG, then with the thrust-line constant and, finally, on the basis of lateral area only with CG constant. And that's it for science.

Frankly, after I'd fared in all the lumps and scientific points it looked horrible. So I raised the thrust-line some, moved the wing up a little, added a few curves, erased all the extra lines and — presto! Brand X was conceived.

With the profile established, I added structure details, borrowing ideas from other models. The somewhat unorthodox two-piece fuselage formers are provided so the basic fuselage can be assembled upside down on a flat bench. Wing dowels are attached to the fuselage using a shear plate in the leading edge of the wing. In a crash, plain ahead. The plate shears at the glue points leaving the wing and fuse relatively intact. My planes have survived several dramatic landings this way.

The ailerons appear deceptively small for this size plane, but the tapered wing area is only 571 sq. ins. The airfoil is straight off Lou Andrews' Sportmaster with no improvements. Tail group is Kwik Fli III with the stab shortened $\frac{1}{2}$ " and 1" lopped off the vertical.

The name came about during the first flight. Takeoff required a nudge of up, then hands off for a 10-pointer. A touch of down

trim and it's straight and level. So far so good. First turn, oops, on its back. Gotta slow down the ailerons. Three rolls now — wow — too fast, but on the wire. Loops? Beautiful. No corrections needed. How 'bout a loop with a snap 'n a half? Ease in up elevator. Now, stuff the sticks in the corner. What happened? That airplane just came all undone.

Let's try something safer like a knife-edge. After all, the main reason for all that fuselage area was the knife-edge anyway. I'll cheat a little 'n pick up the nose first. Now the roll. Now the rudder. Where'd it go? Would you believe a 100 ft.-diameter rudder loop? This thing's just full of surprises.

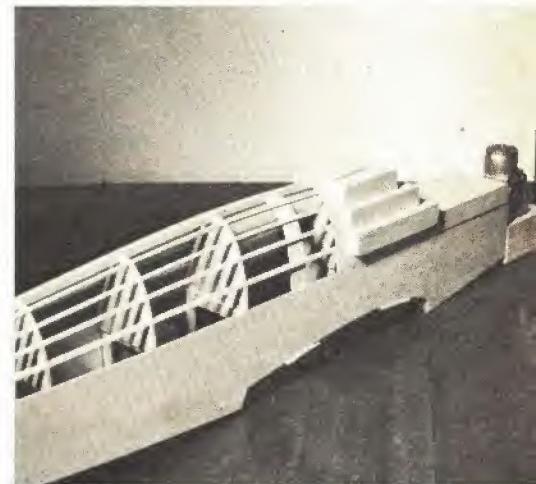
Construction: I won't go through the usual admonishments about "not for the beginner," because I don't care who builds one. Although the ship is tolerant up to a point, there are two absolute requirements: no warps and keep it under 6 lbs.

Select all your wood at one time if possible, and match up sets of sheeting for each wing panel and stab. Set aside until ready to use. Trim and glue sheeting just prior to use for minimum warping and tighter joints.

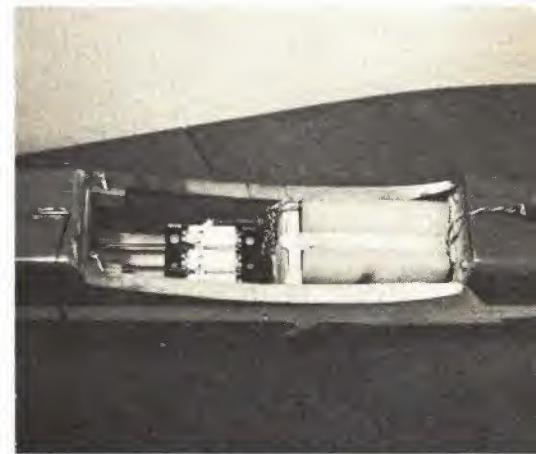
Fuselage: Prepare sides and add ply doubler. Trim the top edge and rear net. Leave a little trim on the front and bottom of the ply. (This provides a little leeway for misalignment when joining with contact cement.) Trim net after joining, match up F3 and W1. Drill dowel holes and set aside. Join the sides. F3 and F5. Set on top of work surface with F3 hanging over the edge of bench. Clamp, but do not glue tail post. Then progressively add F4 through F9. Using a square or triangle, align and glue tail post holding it square to the work surface. When

Continued on page 69

The original name was Kwik-Bar-Henchman-Fli-Master because it incorporated valuable features of these popular R/C craft.



Construction method insures alignment and permits very light-weight structure. Carved cockpit provides strength above wing cutout.



Unusual wing hold-down has dowels glued to fuselage with sheer plate glued to wing leading edge. Has saved model in crashes!



A delightful contest flyer with 60 engine. Airfoil permits slow stable landings; keep weight under 6 pounds — and no warps!

R/C World Championships

Scale at Bremen

FAI rules favor aerobatic-capable planes but all kinds of awe-inspiring models intrigued our reporter.

CLAUDE McCULLOUGH

Photos by author, except as noted

THE U. S. International Scale Event team, consisting of Maxey Hester, Joe Bridi and myself—plus EK Logictrol's Bob Elliott for technical support—almost found itself sleeping at the Frankfurt Airport.

Rescue was a few steps away. Waiting outside the customs inspection gate were three smiling gentlemen who obviously recognized us from our giant stack of cardboard model coffins. The entry formalities took only a few minutes, thanks to a trilingual, officially stamped document provided by the FAI.

We met Bruno Klupp, Walter Reger and mechanic Reinhold Kursten of the German scale team. So it was that we shortly found ourselves at Bruno's beautiful home in the little village of Dornheim, meeting Frau Klupp. Joe and Bob would go to Walter's home in nearby Bauschheim. Maxey and I were to stay with Bruno.

Next afternoon we went to the flying field of the Frankfurter Verein Für Luftfahrt, one of the local area R/C clubs. It had a paved runway on top of a small hill. Many of the members came for the weekend with their families and had set up tents and campers.

The flyers turned the runway over to us when they found we wanted to check out my Fletcher FU-24 for Bremen, so Maxey was pressed into service as test pilot. Despite worries about the all-moving stabilizer, the ship displayed beautiful flying characteristics and the tightly cowled Bantam 60 twin showed no signs of overheating with only the scale exhaust augmenter tubes for air exit. Maxey, as team manager, wouldn't allow me much airtime for practice, it being more important to have an intact airplane at the Internationals.

On Monday, the pattern team members,



Nelson photo

Dr. Amman, Czechoslovakia, flew interesting, British World War I DH-2 to disaster when scale external control cable snapped. Gyrated wildly into the ground.

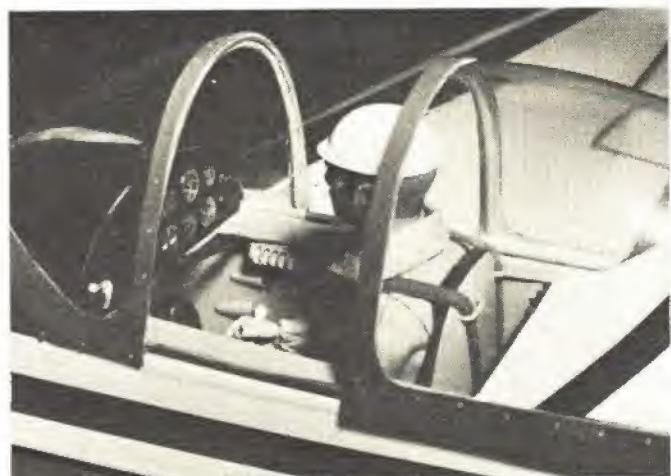
Jim Kirkland and Jim Whitley, Team Manager Ron Chidgey and Judge Bill Northrop arrived at Rhein-Main AFB via military transport. On Tuesday, we were off up Autobahn to Bremen. Evening found us settled in the Hotel Zur Post in downtown Bremen.

Preparation for scale judging was underway Wednesday morning when we arrived, in charge of Judges Roy Weber (USA), Radoslav Cizek (Czechoslovakia), and Ce-



Above: Smiling Roy Yates of Great Britain won first place with this beautiful Percival Proctor. Open cockpit door affords a glimpse of detail which gained him top scale factor of .922.

Right: Herbert Roger, Germany, with help of mechanic prepares Zlin 326 for third-place winning flight. The 326 is older version of the Akrobat with fixed gear, non-controllable prop.



Cockpit close-up of Maxey Hester's Zlin 326AS, reveals full interior detail, including shoulder harness. Note rivets on cockpit framing. Czechoslovakian plane is famed for aerobatics.





Nose detail of Hester's Zlin Akrobat Special. Maxey had two ships, one of which captured first place at the American Nationals. In Round One he put up the best flight at Bremen.



Scratch-built from Sig plans before kit was available, Walter Roger's (Herbert Roger's brother) Russian aerobatic Yak 18PM features Posi-trac gear, flew as smoothly as it looked.



Hard at work on judging in VFW aircraft company hangar are, L to R: Assistant Dienst (Germany), Judge Chicheck (Russia), and Judge Weber (U.S.A.). Model is Charles' (G.B.) Juraca Sirocco.



Lovely Nieuport 11 by Joe Bridi of the U.S. team, had inverted engine concealed behind scale cylinders. Rigging wires are impressive but make assembly slow. Photo by Joe Bridi.

INDIVIDUAL AND TEAM PLACING

Place	Nation	Name and Model	Scale Fidelity	Scale Factor	Workmanship	1st Flight	2nd Flight	Total Score
1	Great Britain	Yates, Roy (Percival Proctor)	691.5	0.922	602.0	2545.0	2378.5	3639.99
2	Great Britain	Charles, Michael (Jurca Sirocco)	676.0	0.901	654.5	1789.0	-----	2942.38
3	West Germany	Reger, Herbert (Zlin 326)	535.5	0.714	437.0	2075.0	2562.0	2801.76
4	United States	Hester, Maxey (Zlin 526AS)	499.0	0.665	427.5	2584.5	2488.5	2645.19
5	United States	Bridi, Joe (Nieuport 11)	549.5	0.732	494.0	2081.0	2146.5	2614.73
6	Italy	Godenzi, Rinaldo (Cessna)	374.0	0.786	267.5	2111.0	2147.5	2329.47
7	United States	McCullough, Claude (Fletcher FU-24)	617.5	0.823	516.0	1343.0	-----	2238.78
8	Great Britain	Bryant, Dennis (RWD-8)	506.6	0.675	488.5	1074.0	1353.0	1884.67
9	West Germany	Reger, Walter (Yak 18PM)	422.5	0.563	446.5	-----	1732.0	1844.11
10	Belgium	Blansaer, Andre (Spitfire)	382.5	0.510	214.5	1064.5	2380.0	1810.80
11	West Germany	Klupp, Bruno (Fokker D-7)	566.5	0.755	481.0	-----	871.0	1705.10
12	Mexico	Elzondo, Alejandro (Fokker D-7)	262.0	0.346	239.5	1947.0	1775.5	1165.16
13	Belgium	Laline, Alfred (Fokker D-7)	276.5	0.368	299.5	1525.0	-----	1137.20
14	Czechoslovakia	Amman, Jost (DH-2)	398.0	0.530	406.0	465.0	-----	1050.45
15	Sweden	Swenningsson, Rune (P-51)	119.5	0.159	135.0	2097.0	1857.0	587.92
16	Sweden	Hellstrom, Svante (Cub J-3)	201.5	0.268	213.0	207.0	641.0	586.28
17	Sweden	Tell, Karl-Einar (Commanche)	75.0	0.100	309.0	1370.0	1883.5	567.35

Team Standings

1. Great Britain
2. United States
3. West Germany

Best Scale Factors

1. Roy Yates 0.922
2. Michael Charles 0.901
3. C. McCullough 0.823

Best Flights

1. Maxey Hester 2584.5
2. Herbert Reger 2562.0
3. Roy Yates 2545.0

Best Combined

1. Michael Charles 1330.5
2. Roy Yates 1293.5
3. Claude McCullough 1133.5



Author with his Fletcher FU-24, U.S.-designed, New Zealand agricultural ship. A Bantam 60 twin-cylinder engine was neatly cowled, and proved vibration free.



Wiping the rain off his British World War II Supermarine Spitfire, Alfred Laline is also a member of the pattern team from Belgium. Note Canadian maple-leaf emblem.



Nelson photo
Monica Nelson poses with WW II Messerschmitt 163 rocket interceptor. German flying-wing was most unique project, did not fly. A 60 pusher engine.



Line-up of scale models in front of spectator bleachers lent an air of some rare international airport in miniature. Odd craft, foreground, is Bryant's RWD-3.



Intricately detailed cockpit of Fokker D-7 by Bruno Klupp includes even the bullets in the cartridge belts. This kind of scale building is indeed an art.

sar Milani (Great Britain). An area had been assigned to each country and contestants were unpacking and assembling models. Our late arrival didn't help. Maxey's Zlin is easy to assemble, but Joe's Nieuport has many small gadgets, turnbuckles and rigging wires, while my Fletcher's canopy and other items gave trouble.

The judges complained that the length of time taken in presenting the models in the display area prevented examining all entries before marking scores, a necessary procedure for rational assessment. The only possible remedy was a review of all scoring sheets after judging, but this was prevented by officials who took away paperwork to the computing department. Further difficulties complicated things, such as odd scales in both inches and millimeters and much poor documentation. The AMA system of awarding a few points for a good scale presentation has resulted in a tremendous increase in the quality of fidelity data presented at U.S. contests and might well be considered for FAI rules.

All the models were check-weighed to determine if they were under the maximum allowable FAI limit of 5 kilos (11 lbs.). Dennis Bryant's big RWD-8 was 5 ozs. over-

weight. His plane had passed at the British Nationals some weeks before and placed third. The weather in Bremen was very humid, so he thought perhaps it had absorbed enough moisture, and tried baking it in the sun. More drastic measures were necessary, removing unnecessary bits, and substituting lighter equipment. The British team would have been eliminated from the team prize if the weight problem could not have been overcome.

Thursday, a full round of scale flying was scheduled before pattern competition. Dr. Helmut Ziegler, the Scale Event Director (and also Chairman of the FAI Scale Subcommittee) made things as enjoyable for the contestants as possible. The relaxed, low pressure atmosphere was a great help, yet things moved efficiently.

The flight judges also handled scale scoring. They were placed at tables about 20 ft. apart, an idea that has a lot of merit. Having sat side-by-side in the usual U.S. judging lineup and listened to conversations that clearly influenced scoring outlook, or just distracted the judges from paying close attention to the maneuvers being performed, separation should be made a standard system.

The contestants flew from wherever on the runway they wished. Maneuvers were called over a bull-horn or microphone by the mechanic. This system may have initially been required by the separation of the judges, but the contestants felt more comfortable and relaxed, not having to assume a fixed position on a prescribed mark.

The J-3 Cub of Hellstrom led off. He had difficulties with ground looping and finally resorted to hand launch. Since I was number two on the flight list, I had little time to get nervous, but had some problems in the air because more down trim was needed, but not available, particularly on the three maneuvers requiring use of the flaps — overshoot, touch-and-go and landing. And on my right stick aileron-elevator mode, I don't coordinate well trying to feed in down trim with the stick evenly. Another bad mistake was that I lined up my pattern with the wind, diagonal to the runway, instead of with the runway, thus presenting a bad view to the judges. This was soon pointed out to me in a full run-down by teammates, on what to do differently on the next flight!

Bryant and Elzondo turned in a good flight, though not helped by the gusty wind and next came the unusual DH-2 WW I pusher entry of Dr. Amman of Czechoslovakia. An ominous noise, thought to be the elevator cable breaking, resulted in wild gyrations and a dive into the ground. Herbert Reger showed the capabilities of his Zlin 326 with a 2075, and Blansaeer did well with his Spitfire.

After Karl-Einar Tell's Posi-Trac equipped Comanche, Maxey was up with his Zlin 526AS Akrobat. He got quickly into the air with his usual precision and began the best flight of the first round, and the meet. His gears were converted MK nose gear units because of the swingback Zlin system. The Zlin is an ideal airplane for the present FAI schedule.

The next contestant, Mick Charles, had not only won the British Nationals with his colorful Sirocco but had an unusually high scale factor of 0.901 and was the favorite to win. Control difficulties caused an aborted takeoff. On a second attempt he got into the air O.K., though the airplane seemed a little tricky to fly, possibly because it is short coupled, or perhaps from a continuation of control problems since a few glitches or twitches showed up. Still, things proceeded well until the Cuban Eight, when the red and white beauty snapped out and dived into the ground at high speed. I'm sure every scale builder there felt that impact. The thought of many hours of intricate work being so swiftly reduced to junk was sobering.

Continued on page 50

A place for everything?

Subject: Work- bench

CRAIG MASSEY

Dear Mr. Editor:

I am not a very good typist so try your best to make out what I am trying to say. I hope you will forgive the formal set up of this letter but I just have to follow the book in doing things like this. While I was sitting at my work bench working on a HLG I noticed what a really fascinating thing a bench is. I could not keep this thing quit any longer and just had to tell some body. I would have told my mom but she didn't want to hear about nothing and my dog wanted to bury a dumb bone so I deceided to write (I'm not really writing but it would sound funny to say I'm typing you) and tell you about it. Enclosed is a super detailed, scale, 3d colored drawing of a typical work bench.

1. This is where Joe lives. He's the spider that eates all the termites that live in bench. (I don't know if spiders eat termites but then who does)

2. This is the short leg. Self explanatory.

3. The intelligent plugs. Right when you need power the most they have the uncanny ability to short out.

4. This is the termite that got his body sandpapered to the bench, we can get sooooooo, sooooooo cruel.

5. Remember when you where Mono-coting the wing of the glider, and then your sweet little angel of a son got his jelly hands on the \$499 R/C stuff that you just got in? Well that's where you laied the iron

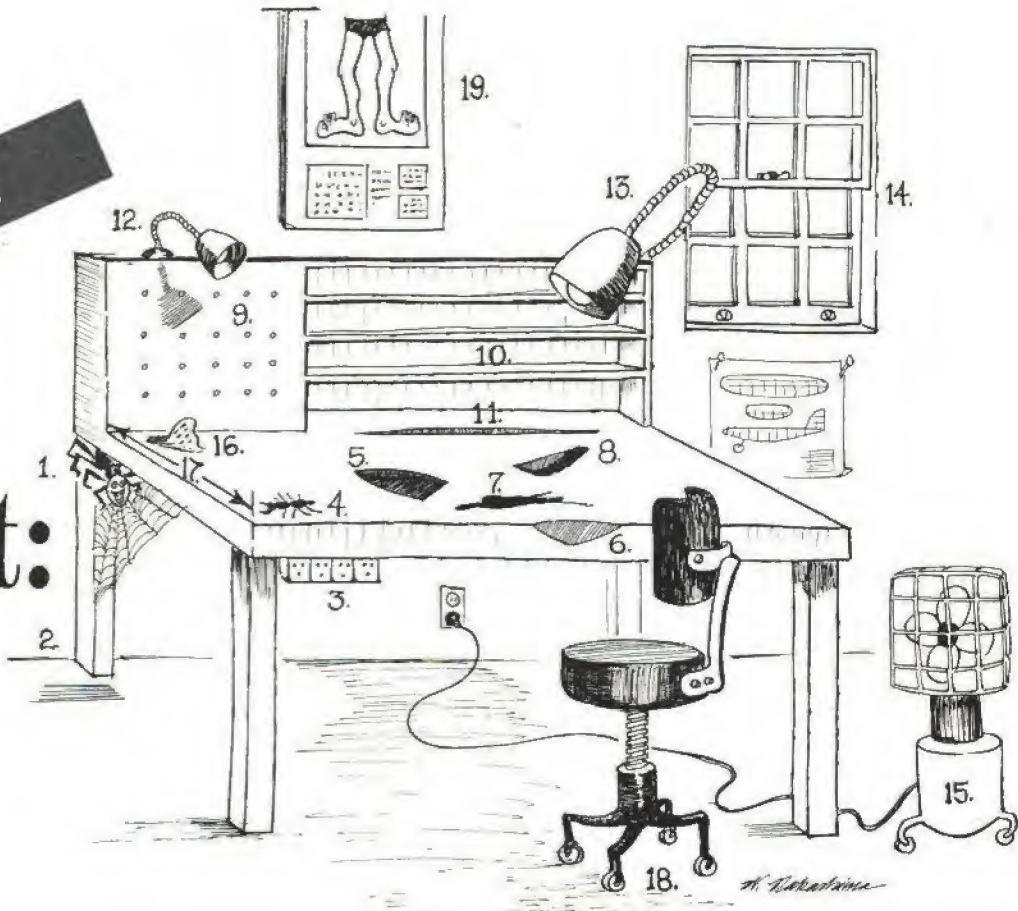
6. The spot where you sand all the dihedrals in the wings of the HLG's and little planes.

7. The blood stain. You should learn how to cut with an X-acto knife.

8. Think back to the time when the dog jumped up at you and you dropped that fastly spinning Moto-towel (I cant spell worth saw dust) on the bench. Thats the chewed up part.

9. This is the famous peg board in which the holes are too big and the pegs are too small.

10. The shelves. They sloped slope toward the left and are only 5½ inches high whereas they should be 6inches. (This was a bad sentence because the suposedly glued wings of my HLG just came off and it has caused me considerable grief.) (I wish I could spell)



11. The crack. Because of the short leg tiny peices of things tend to roll down this crack and are then eaten by the dog or carried away by Joe to reinforce his web.

12. The left lamp. Has 25 watt bulb. What good is it ???

13. The right lamp. has blinding 150 watt bulb and a neck that won't stay where you put it.

14& 15. The dynamic Duo. The bottled stuff says to use in an openly ventalated area, or serious damage to your body might result When you are doping a wing, at the same time watch that now at the same time the fan shorts to a stop and the window closed hopelessly stuck.

16. This is the glob of glue that came to being when that big industrialy drill fell off on the king size tube of Ambroid-glue.

17. The back board is 1 inch to long for your arm. Doesn't that get you all hot and bothered under the collar?

18. This is IT. The CHAIR. You by some miraculous work ahve just finish a plane. You jump up and yell woooopppeee and when you come back down the chair has just decreased its hightness by 17 inches or it has rolled away. In a panic you grab the bench over it comes a nd you imagine the rest. to make it super bad the wife (or mother) says are you all right?

19. This is the Playboy eAlander that was the reason that most of you sat down at the su stupid bench any way. Well that is the end. You may fell free to laugh, tear this up, show it to you freeloading brother-in-law so he may get so sick he may die, or if you fell up to it throw darts at it maybe even delta darts. And if your really felling good you might, might now, try to correct this, because if you can, feel ready to take on Phil whats his name.

Yours truly, sincerely, lovly and all that

Craig Massey

and in case you want my address for
to send a bomb to or something
4700 n.e. first terrace
Pompano beach Florida
33064.



Penni Helicopter

World's first, real, rubber-powered copter is simple but a scientifically developed free-flight demonstrator all principles of rotor-wing operation. Build it from scrap!

JOHN BURKHAM

Many men came to me after I flew Penni in the auditorium at the DC/RC Symposium last May and quoted their sons as saying, "Daddy, make me one of those, please!" It is rather cute flying around like a real chopper and it's fairly easy to make — especially if you use the "quickie" hubs instead of the universal hub. Most of you can build it from the plans only, referring to the text in case it doesn't fly right away.

This little model was designed during my lunch periods at work and mostly built there, too. She was made specifically as a stability or instability demonstrator for the DC/RC Symposium in May 1969. Big enough to have decent performance, but not big enough to be damaged when colliding with tables, lamps, etc.

If you build the universal hub you can

press in balsa plugs or wedges to prevent tilting of the aluminum tub with respect to the shaft and/or the hub. You can demonstrate the stability of the completely free universal hub with stabilizer bar and of the feathering-only hub with stabilizer bar. (Feathering is pitch changing of both blades, one up, one down, about the hinge axis which is nearly parallel to the blades.) You can also demonstrate instability of a completely rigid rotor; that is, no feathering or teetering, and of a teetering-only rotor.

If you don't want to experiment you can just build the "quickie" hub shown and have a model that flies just as well as or better than the universal hub. You'll notice that on the quickie hub the blades can feather easily by twisting the feathering pin in the diamond eye, but when the rubber is wound up and driving the rotor, the force of the eye on the feathering pin creates friction to resist any up and down sliding of the pin in the eye, as would be caused by flapping or teetering motion of the blades. This friction damping of flapping motion prevents the fuselage from swinging to and fro like the one with the universal joint.

Fuselage: You can start building any part, but I like to start with the fuselage (sticks) and add the landing gear so it can stand up by itself. You can add parts to that and not have them lying around loose, or lost.

Cut the $\frac{1}{8} \times \frac{3}{16}$ " pieces to length and shape the ends as shown on the drawing, taper the tail boom, and sand off rough edges. Mark on the balsa where they come together, then cement them together at right

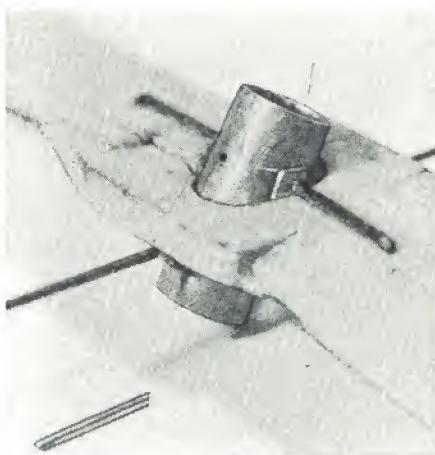
angles to each other. (I recommend Titebond for wood-to-wood joints and Duco cement for metal-to-wood except where solder is called for. Epoxy also is good but is more trouble.) Glue on the 1/32 sheet balsa gussets.

Form the .045 wire nose piece, force the ends into the balsa sticks, wrap with thread, and cover the joints with Duco cement. Bend the landing gear struts from .025 music wire (.031 is ok if you can't get .025). The landing skids can be made of bamboo or 3/32 aluminum tubing, or $\frac{1}{8}$ sq. hard balsa.

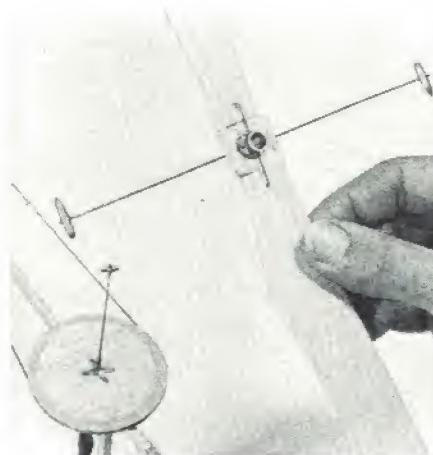
If you get a 12" piece of aluminum tubing, cut it into two 6" pieces and make the skids a little shorter on each end than shown on the drawing. Bind the rear strut to a curved piece of $\frac{1}{8}$ hard balsa and cement it to the fuselage after cutting a small notch for the wire to fit up into. Press the front strut down onto the fuselage, bind with thread, and cement. After the struts dry in an approximately straight position you can tie on the skids. Here is where you find out why the front strut ends bend forward and the rear strut ends bend backward.

Put marks on the skids where the struts are to be fastened. Hold a skid in about the right position and wrap a rubber-band tightly around where one strut touches the skid. Now wrap thread around the other strut and skid. Remove the rubber band and wrap the first strut and skid. Do the other skid same way, line up both skids, and cement with Duco. Now she sits on her feet.

Hook, rotor shaft, pulleys: Bend a small hook as shown and glue it on the bottom of



Heart of a copter is rotor-head assembly.
The more complicated universal hub is shown.



A pin, left in photo, goes through the hub and little tube on the rotor shaft below.



Note how stabilizer bar bends around hub.
It controls individual blade angle of attack.

the motor-stick. Get thin aluminum (.010 to .020) or find an aluminum beer can. Even a thin tin can will do. This is for washers. Cut two washers rectangularly, $\frac{1}{8} \times \frac{1}{4}$, and drill a hole in the center of each just a hair bigger than the size wire used for a rotor shaft.

If you don't have drills that size make one or two out of music wire. File the end flat like a tiny screwdriver then bevel the end at an angle on each side, coming to a point in the center so it looks like the end of a regular drill except for no twisted flutes. If you're drilling tin-can steel, a needle sharpened like a drill holds up better. And if your hand-drill or electric drill won't take that small size, solder a piece of 1/16 brass tubing, or rolled-up tinplate, on the back end of your homemade drill. This drill, being so small, should be long enough only to stick out of the chuck $\frac{1}{4}$ " or less. You could also use an X-acto pin vise and twirl it between your fingers.

Drill a hole down through the fuselage stick for the rotor shaft. If it leans to the left a little, say three or four degrees, OK. That will tilt the rotor to the left and offset the thrust to the right of the tail rotor. This is not really important. Now stick a piece of rotor shaft wire through the hole and glue on the bearing plate washers just made. Pull that wire out before it gets stuck in permanently, cut off a piece $3\frac{1}{2}$ " long, and bend either a diamond-shaped eye in the end for the "quickie" type hub, or a round eye to fit over the 1/16 brass tubing of the universal hub.

Cut a 5/16 sq. piece of thin brass or tinplate. Punch or drill a hole in the center of the brass, slip it up on the rotor shaft to a point $2\frac{1}{4}$ " below the center of the eye. Clamp the bottom half in a vise so that the square washer is held at the right place and perpendicular to the shaft. Using soldering paste, solder it securely there, because this washer takes the full tension of the rubber, and full torque while you're

holding it by the pulley and feeding the tail rotor belt onto the tail rotor pulleys. Clean off all traces of soldering paste to prevent rust.

Draw circles on 3/32 hard balsa the size of the two pulleys. Cut out these circles with sharp knife or razor blade and sand them to smooth circles. Drill a hole in the exact center of each, the size of the wire that goes through it. Take out the drill, slip the pulley blank on it and twirl it to make sure it isn't eccentric. It must be in the center!

To make the groove around the edge of each pulley, start by cutting a small 1/32-wide V-groove around the center of the pulley's edge. Be careful not to cut too deeply. Next go around the edge again starting from a point about $1\frac{1}{64}$ " from the edge and cutting toward the center. When you get an even 60-degree V-groove all around the edge, fold a piece of fine sandpaper and sand the groove with the folded edge. Dope and sand the groove a couple of times, so that there is a smooth, hard groove that the

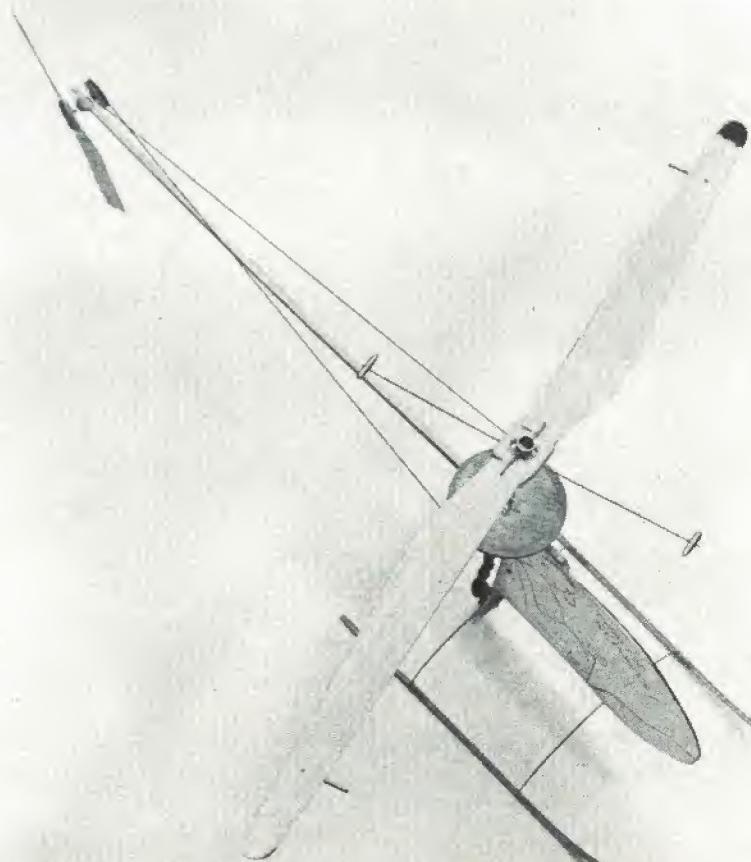
thread won't climb out of even when winding the rotor by hand.

Slip the big pulley on the bottom end of the rotor shaft and cement it to the 5/16 sq. washer. Cement another washer on the bottom of the pulley. Before the cement dries, twirl the shaft in your fingers and, if necessary, force the pulley perpendicular to the shaft. Cut out the three balsa pieces for the tail rotor. Slip on another tiny washer, or a glass bead, add a little Vaseline or Lubriplate, and slip the shaft into the fuselage main bearing hole.

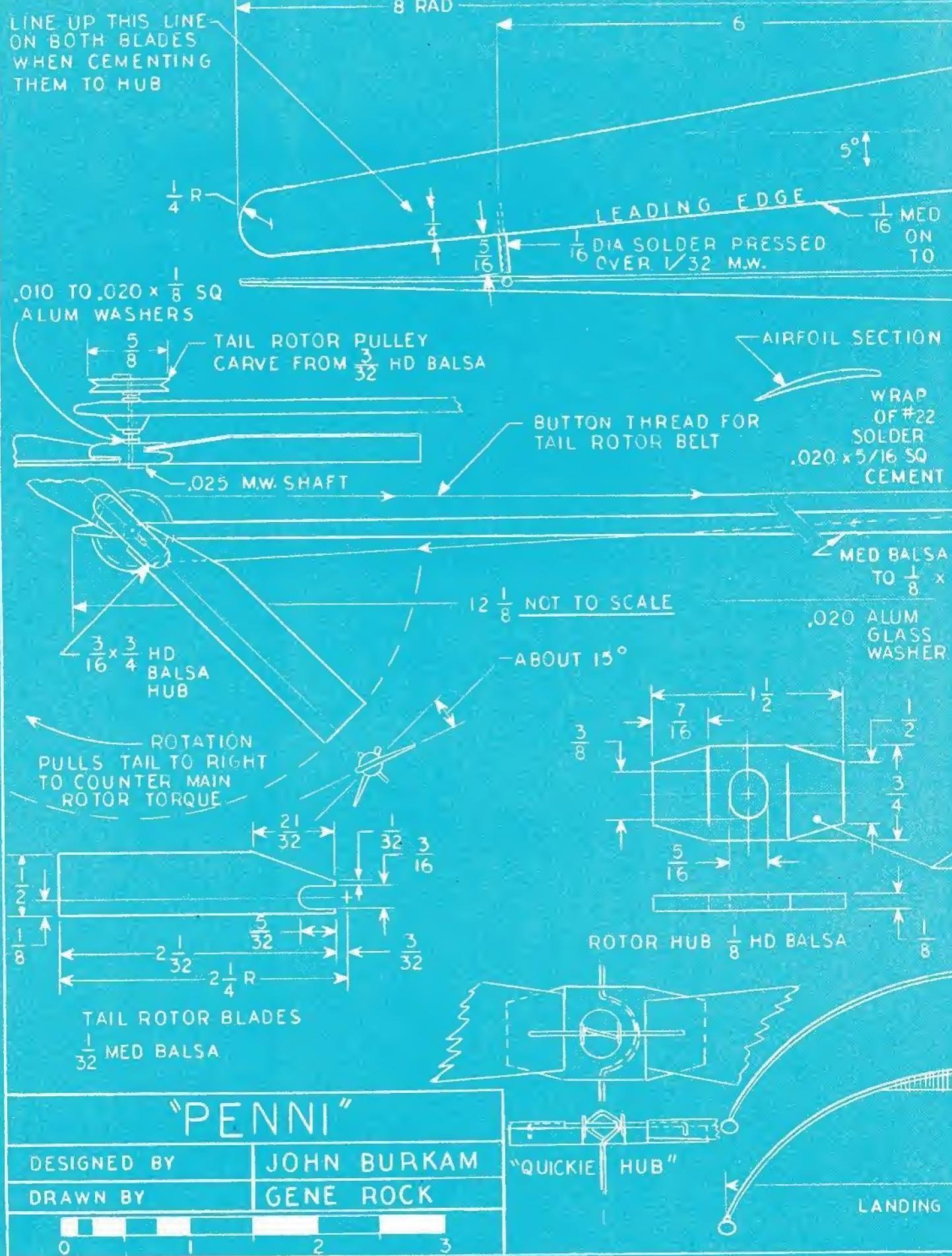
To bend the hook on the wire without wrecking the fuselage, hold the wire in long-nose pliers, then bend the wire around those pliers with another pair of pliers. Start with the outermost bend and work back to the middle. You will have to guess how long it should be before bending. This method avoids putting any force on the balsa wood.

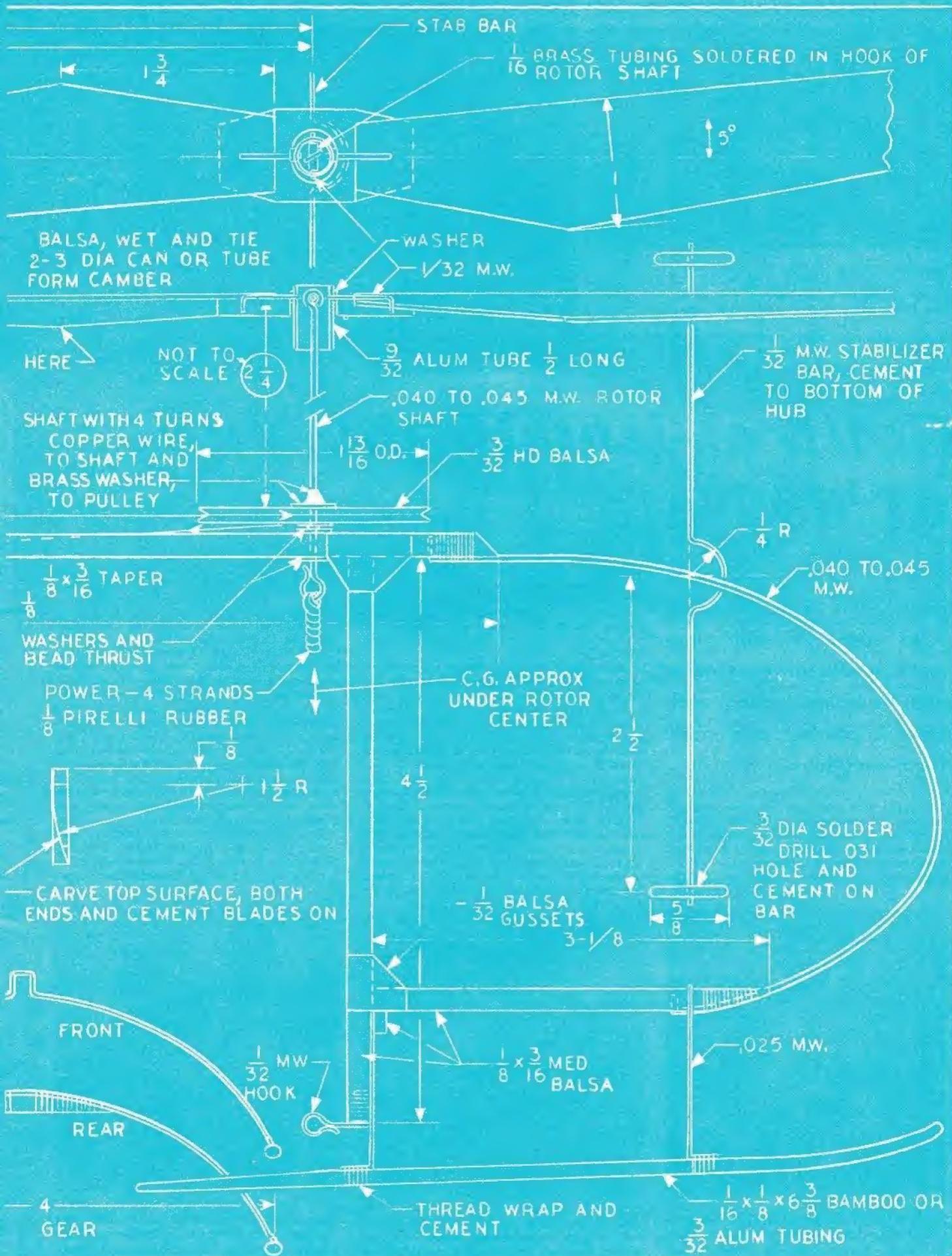
Tail Rotor: Finish the tail rotor before you
Continued on page 66

Your own friendly traffic copter is ready-to-fly. Paper used for drawing is functional.



Tail rotor spins several times faster than main rotor. It has fixed pitch only.







The new Class-C speed record holder is Roselle and Frye's tuned-pipe job with automatic needle valve and home-made engine. Did 179.07 mph Mono-line.

Bob Lampione was upset winner in Open Stunt and in Jim Walker Award fly-off. Model is Fox 35-powered, scaled after F-86D flown by Air Force Thunderbirds.



Control-line Highlights at '69 Nats

Text and photos by BILL BOSS

Would you believe: scale model with 13 working features, speed job with automatic needle valve, Winders and Vampires eating each other in combat, and many foam-wing jobs in stunt?

ARMED with a portable tape recorder, a borrowed Nikon camera, a small note book, an official looking blue helmet and a blue-ribbed name plate and a lot of guts, I set out to cover the control-line events.

For those of you who were not there, the

weather was 90-95 degrees and very humid. So this is the way it was:

Speed: The speed boys put in the usual large number of flights. The judges and workers at the speed circles are to be complimented for the efficient way in which they handled the busy flight line.

Many excellent flights took place in all classes. Speeds were somewhat slower because of the increased wire size this year. It was estimated that the large wire reduced speeds about 8-10 mph from last year's wire sizes. Nevertheless, the team of Roselle and Freye set a new speed record of 197.08 mph with their tuned-pipe C-class ship.

True sportsmanship was demonstrated during C Speed. Frank Garzon of Central Islip, N. Y. (of the team of Arpino and Garzon) put in a 10.1-second flight which, at that time of the day, was good for a second place. It would have earned Frank a second or third place at the end of the day except for the fact that he was scheduled to fly proxy for Tom Roman of Hicksville, N. Y. As it turned out, Frank turned in a 10.0-second flight with Roman's plane to give Roman second place and knocked himself down to fourth place in the final standings. It is really something when you go out to the center of the circle and beat yourself.

Rossi and Supertigre engines dominated the various classes. Only a few tuned-piped engines were seen. The heat and humidity kept most flyers from getting peak engine performance.

The performance of the Brown family, from Staten Island, N. Y., was impressive. George Brown Jr. and sister Mary Lou (both seniors), with help from Dad at the circles, placed seven times in the various events. George Jr. took first in FAI, A and B Speed; second in B and Jet Speed; while Mary Lou placed fourth in A and B Speed. The Brown family showed what can be done when all members of the team work efficiently together.

Rat racing: Nothing exceptionally new was found. Most of the planes were of original design, built around upright pans. K&B and Supertigre engines with rear rotors were

dominant. A few contestants used 4-oz. tanks and cutoff devices. Most used 2½ to 3 oz. tanks without a cutoff device. It seems there is less trouble this way.

Talking with the McIntyre boys from Los Angeles, Calif., we found that, on the West Coast, Rat Racing is extremely popular, being flown in three classes with engine displacements of 15, 29 and 40.

Combat: Some of the most exciting matches were seen in all classes, with many kills being made within seconds after the matches started. The Sterling Winder and Top Flite Vampire dominated all classes. Fox 36X BB and Supertigre 35 BB engines were widely used. Foam wings and iron-on type finishing materials were everywhere. Pacifiers, rather than metal tanks were employed by many contestants.

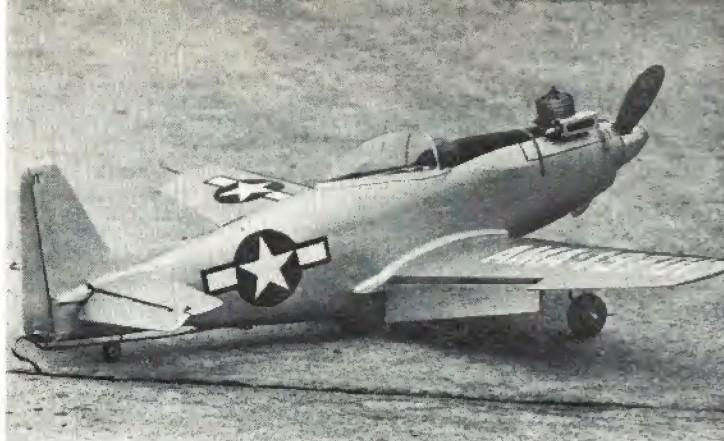
Both Will Rogers of East Hartford, Conn., Open Class; and Rickey Hayes, Winston-Salem, N. C., flew foam-wing Vampires to victory in their respective classes. Rogers



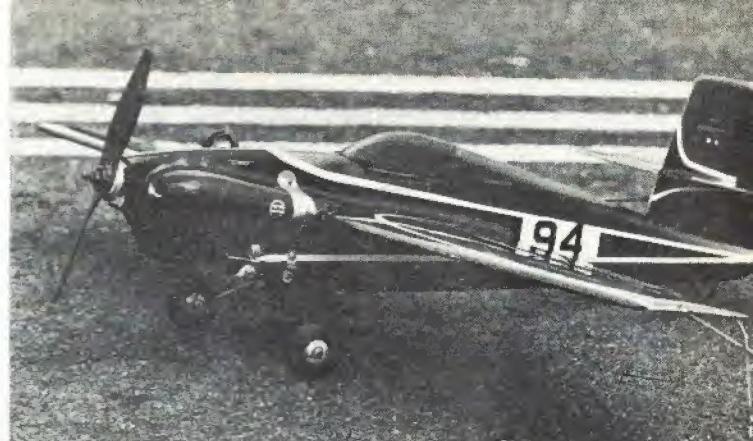
Smiling Open Combat winner, Will Rogers, used foam-wing Vampire with ST 35, pacifier tank. Plastic covering materials and foam wings popular in all Combat classes.



Second placer in Rat Race flew this lean machine. Bob Wright proudly shows off his trophy and model. Note engine is only partly cowled for good cooling, yet streamlined.



Author's entry in 40-class Navy Carrier is Jetco-kit-based P-51. Uses K&B 40 RR engine, weighs 2½ lbs. Considering weight and wing area, flaps are necessary for good low-speed flight and landing.



"Ginny" is fairly uncommon Goodyear racer, but Jim Fasimpaur scaled up some three-views for this neat ST 15 RR-powered model. Unusual landing gear installation is low-bounce torsion-bar type.



Very different approach to competition stunt design. Classical, highly finished model by Bill Werwage, in front, and much-talked-about and nearly scale Bearcat by Al Rabe. Both beautiful flyers.

powered his Vampire with an ST 35 BB, while Hayes used a Fox 35 BB. Both had pacifiers for fuel tanks.

Control-line stunt: The Open Class saw the upset of the year. It was won by Bob Lampione, Astoria, N.Y. Bob's had placed last in the 1963 finals fly-off. He not only won stunt this year, but walked off with the Jim Walker Award with a 583 score. Bob flew a Fox 35 semi-scale original of the F-86D, fashioned after the Thunderbird Squadron, to a 598 score. He topped Bill

Rabe Jr. by four points. That was close!

Bob's plane weighed 52 oz. and featured a foam-wing core with Aerogloss finish. Bob is the Prexy of a newly formed club in New York City, the "Queens Stunt-masters." They are dedicated to the promotion of the stunt event.

Bill Rabe Jr., Irving, Tex. took second place in Open Stunt. He flew one of the most talked-about planes at the Nats. It was a stunt Bearcat that was very close to scale and a most spectacular flyer. Bill's plane

weighed 56 oz. Power was Supertigre 46. Featured was a paint job of a privately owned Bearcat.

Bill's Bearcat featured rudder control linked to the elevator for yaw control. These principles of rudder controls on the Bearcat were outlined in the scale P51 stunter by Bill in the June '69 issue of *American Aircraft Modeler*.

Heartbreak was suffered in the Junior finals fly-off between Dennis Adamisin, *Continued on page 56*



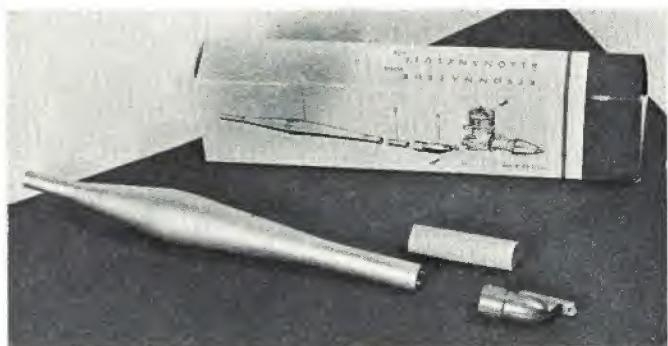
Junior Stunt winner, Dennis Adamisin, combined classical stunt design with scale appearance of Hawker Typhoon. Paint scheme of target tow plane in Profile Publication.



Fox 36-powered Vampire was flown by Ricky Hayes to victory in Junior Combat. Because of hot fuels and wild gyrations, fiberglass compartment used with pacifiers.



Winner in Junior Scale was Elliot Dixon who flew Fairchild PT-19. Because of model's dihedral, he arranged leadouts to pass diagonally through wing so craft flies level.

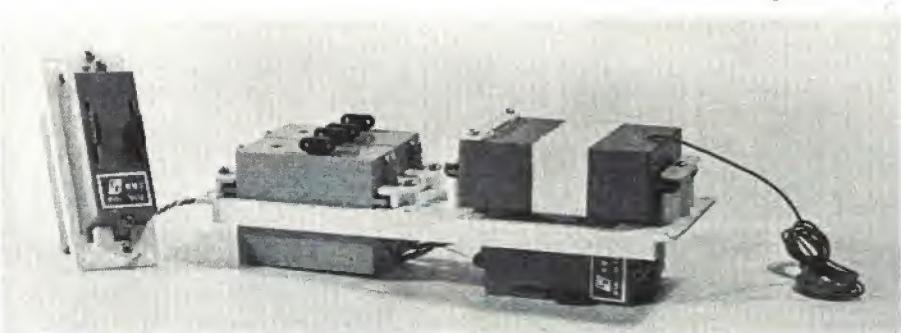


Supertigre/Tuned exhaust for FAI Class 15 engines. Allows performance increase up to 26,000 rpm with pipe and manifold alone. Sleeve insert can be progressively lengthened to provide optimum power down to 19,000 as on larger propellers. Write **World Engines Incorporated**, 8960 Rossash Ave., Cincinnati, Ohio 45236.

Centuri Engineering Co./Six flying scale rockets. Including 43" Saturn V, Saturn 1B, rocketsonde Nike Smoke, V2, and two different mods of Little Joe II. Series utilizes fully tested rocket engines to attain flights of more than 1000', returns to ground on automatic-eject parachute. Reuseable. Full-color 100-page catalog, 25c, refundable with order. **Centuri Engineering Company**, Box 1988, Phoenix, Ariz. 85001.

NEW PRODUCTS CHECK LIST

Write the manufacturers for more data; tell them, "I saw it in American Aircraft Modeler."



EK Products Inc./Servo and receiver mount kits. Shown are UM-2 for mounting receiver and two servos on one side, and third (motor control) servo beneath the receiver on an AM-1 mount which is included as an accessory. Also AM-2 for mounting one servo vertically. Other picture shows UM-3 for mounting three servos, and AM-1 separated for horizontal mounting of aileron servo. All mounts are constructed of plastic and come with all necessary hardware for mounting EK equipment. Price: UM-2 (includes AM-1 as accessory), \$3.95; UM-3, \$1.95; AM-2, \$1.25; AM-1 (purchased separately), \$1.25. Write **EK Products Inc.**, 3233 W. Euless Blvd., Hurst, Texas 76053.



Stinger Mfg. Corp./Fiberglass Nobler; Warner Industries, Inc./Wing cores. Nobler fuselage now available in fiberglass in variety of solid and candy-flake colors. Overall length 37". Price \$26. Write **Stinger Mfg. Corp.**, 2331 West Holly St., Phoenix, Ariz. 85009. Also matching foam core wings for either R/C or C/L. Price \$8.55. **Warner Industries, Inc.**, Box 8339, Columbus, Ohio 43201.



Orbit Electronics, Inc./Mk II Handbook. Excellent printed and well planned, handbook is intended primarily for Orbit users but is storehouse of data for all R/C flyers. Featured in addition to digital transmitter data are general discussions on servo mounting, control linkages, etc. Cost \$1.00. Order from **Orbit Electronics, Inc.**, 11601 Anabel Ave., Garden Grove, Calif. 92640.



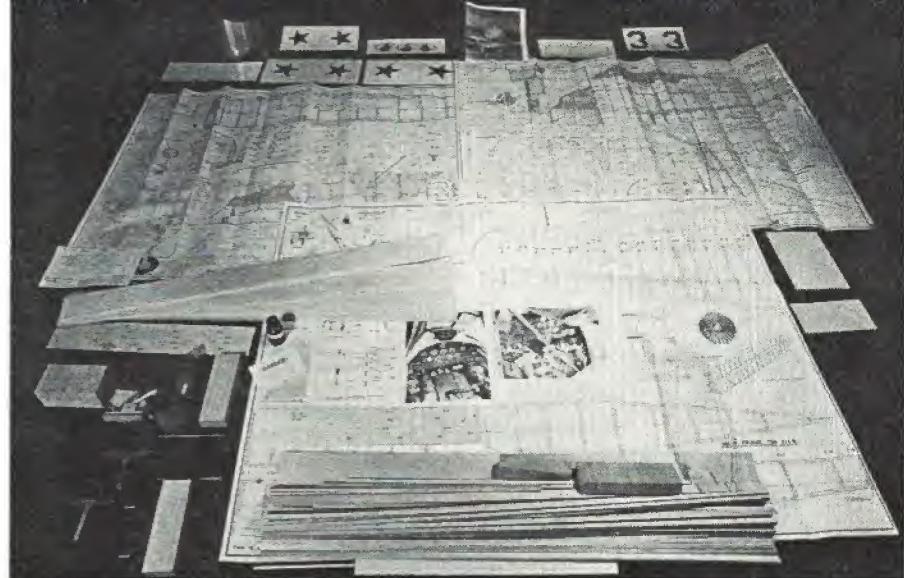
Pettit Paint Co./Hobhypoxy. Convenient for quick fix in field. **Hobhypoxy** comes in easy-to-handle dry packs. Tear off end, mix two solutions together, use immediately. Stiffens in 5 min., cured in 15. **Pettit Paint Co.**, 507 Main St., Belleville, N. J. 07109.



Moody Machine Products Co., Inc./Socket wrench set. Compact, accepts five interchangeable box or socket wrench fittings on either magnetic or non-magnetic handle. Fittings: $\frac{5}{64}$, $\frac{3}{32}$, $\frac{7}{64}$, $\frac{1}{8}$, and $\frac{5}{32}$. **Moody Machine Products Co., Inc.**, 44 Dudley St., Providence, R. I. 02905.



ACE/Pulse Commander. New single-channel R/O pulse proportional guidance system provides high RF output plus reliability. First of three pulse propo units, R/O transmitter may be factory-modified at later date for Ghost or Fast Pulse by switching pulser, reducing cost of more advanced systems. Price \$70 to \$75 depending on actuator size. Factory conversion prices to be announced soon. Write **Accessories Components Equipment**, Higginville, Mo. 64037.



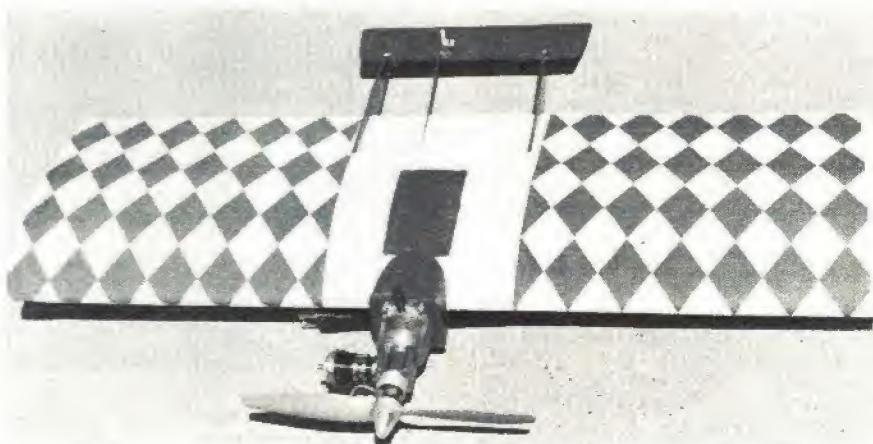
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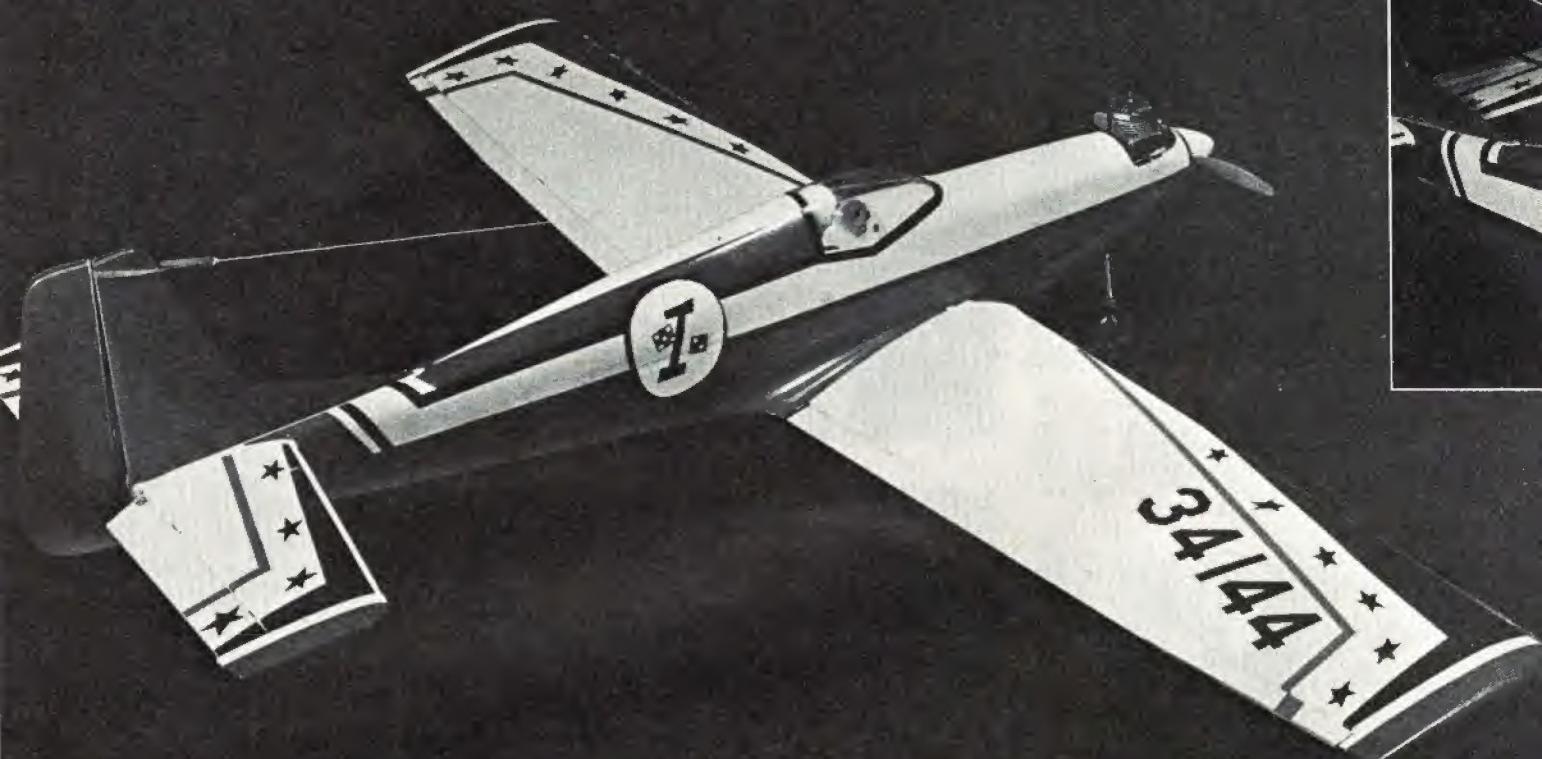
Sig Mfg. Co., Inc. / 1 1/2A C/L. New combat model features molded foam wing, die-cut balsa. High performance for only \$2.50. Write **Sig Manufacturing Co., Inc.**, Route 1, Box 1, Montezuma, Iowa 50171.

Sig Mfg. Co., Inc./YAK 18P/PM. Kit details of model shown in Dec. Check List. Includes 9" drawn aluminum cowling, decals, canopy, necessary hardware. Extremely detailed plans and instruction book eases task of building up super-detailed balsa construction. Kit permits building of 18P (relatively easy to fly) or PM (hot ship!). Wealth of info on this Russian stunter/trainer in enclosed book. Write **Sig Manufacturing Co., Inc.**, Route 1, Box 1, Montezuma, Iowa 50171.



Testor Corp./McCoy .049. Engine comes fully assembled with nylon 6" prop and stunt fuel tank. Mounts radially or on beams and features patented automatic starter and front rotary valve, hi-compression glo-head with platinum element. Pre-packaged. Price \$5.98. **Testor Corp.**, 11500 Tenn. Ave., Los Angeles, Calif. 90064.





The Caprice

How to make your ready-to-fly R/C a personalized work-of-art.

GEORGE HILL

CAPRICE involves some rather simple modifications to the very fine Citron designed by Jim Kirkland and kitted by Lanier Industries of Oakwood, Ga.

As far back as the 1960's, there have been classic R/C designs: Stormer, Taurus, Candy, Phoenix, Kwik-Fli, and Citron—to name just a few of the better-known planes. Most of these winners have been modified in some way or another, but the more successful changes have been simple ones with a particular objective in mind. More rudder or cowled engine—perhaps a dash of Nobler for something special.

Watching Ron Chidsey and Jim Kirkland fly Citrons is certainly enough to convince anyone to rush right out and get one. As a matter of fact, the '69 Nats flight-line spoke for the popularity of the Lanier version.

My first Lanier Citron flew like a dream, but ended up like a nightmare due to a non-habit-forming maneuver. I had a couple of other planes but missed the outstanding characteristics of the Citron. Deciding to try another Citron, it occurred to me that here was an opportunity to make a few simple changes from readily available parts that would not deter from the original and might, in fact, improve the design in certain ways. First, a personalized look, more side area, and more fin and rudder area. A number of other improvements were made which I have been using on Lanier plastic models for some years.

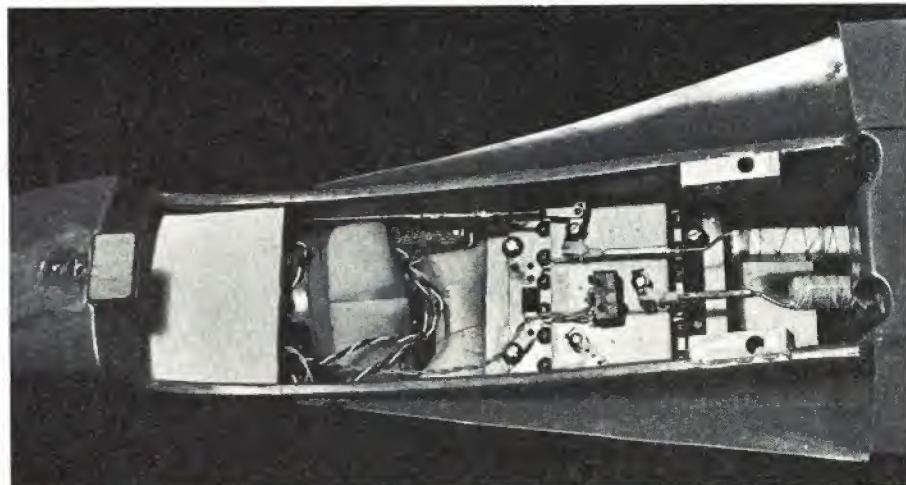
The P-51 rudder affixed to a Lanier Mid-

et had become a trademark for me around various east-coast meets so I decided to try it on the Citron too. This fin and rudder are not only distinctive, but are also quite effective aerodynamically. A turtle deck was added from the remains of a Lanier Pursuit to increase the side area. Then the canopy from a defunct Midget was fitted to complete the fuselage shaping. All these parts, fin,

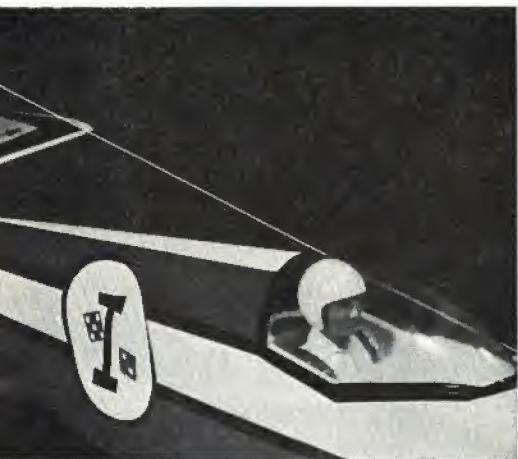
rudder, deck, and canopy can be obtained from Lanier at nominal cost.

If you have the parts available and one of the Citron kits, let's get to work. We presume you have followed all the directions and instructions in completing the Citron kit to the point where the fin is mounted.

The P-51 fin takes very little trimming to fit. Spot-glue the front sparingly with Aero-



Wing mounting is with Lanier's plywood leading-edge keeper and the plastic screws going into blocks epoxied inside. Coat blocks and keeper with epoxy to fuel-proof them.



The area behind pilot is the built-up rear deck from a Lanier Pursuit. Color lines are laid out along plastic seams.

Cement. Use the smallest brush you can find — that way it's a little harder to use too much. Next, glue the plywood upright in place with Silastic. Make certain the fin is properly aligned, checking it with the wing and stab. Now carefully Aero-Cement along both sides of the fin to complete the joint.

Trim off a portion of the top deck of a Lanier Pursuit measured from the fin forward 16". Also cut off the canopy or windshield part until later. The long piece will become the new decking for the Citron. Trim this to shape shown in the photos. Fit the deck rear edge to the fuselage even with the new P-51 fin. Position the decking so that it extends the height of the Citron fuselage by 2 1/4" and hold its position with masking tape. To get a good fit at the rear, a short centerline slice may be helpful.

The forward edge of your new deck should come out even with the Citron's cockpit indenture. Trim your Midget's canopy along the obvious lines and fit in place on the new fuselage with a 1/4" overlap at the rear edge with the decking. The bottom edge of the canopy should be even with the decking. If not, trim accordingly. With the deck all lined up and fitting evenly all around, Aero-Cement it in place.

If you like an occupied cockpit, one of the 2 1/2" tall Williams Brothers sport pilots is nifty. Trim his shoulders to fit the cockpit area and mount him with Aero-Cement. Fit and glue the canopy in place, being sure to overlap 1/4" at the rear with the decking.

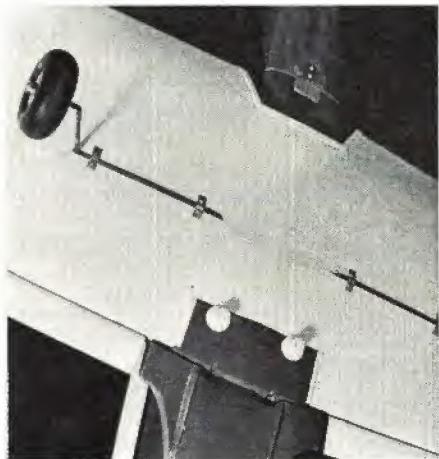


Tail mounting is slightly beefed up. Note home-made fully-adjustable control horn device made up of scraps of Aero-Sheet.

Since I had the remains of my former Citron handy, it was easy to cut the rear fuselage parts off around the stabilizer mounting and forward of it several more inches. This piece was added to the new plane as an external doubler. I plan on flying this model for a couple of years, and here is one area of the model where fatigue may show up. It is not absolutely necessary, but I wanted to use some more of the old plane to get my money's worth.

The bit of weight added to the rear will now be compensated for by some nose work. With many Lanier planes, it has been my experience that the engine gunk and fuel eventually softens and soaks everything. So we fiberglass the inside of the nose both above and below the mounts, all over the firewall, and behind the firewall.

Prepare some 1"-wide fiberglass cloth strips, mix some Hobbypoxy Formula II. While the glue starts warming up by itself, take some 220 garnet paper and rough up the inside of the engine area. Reach in from the wing saddle area and lightly sand the plastic back to the wing leading edge. Now coat the nose, firewall, and rear of firewall and inside forward fuselage area with the epoxy. If necessary, thin the glue with a bit of rubbing alcohol. Lay in the fiberglass strips overlapping at the edges. The cloth should tie the mounts to the sides, firewall, and bottom of the nose. When hard, the nose is very much stronger and absolutely fuel-proof.



Main gear track is widened by bending wire outward a bit. Strip of heavy Aero-Sheet used to carry load at wing mount bolts.

Our control horns are a bit different too. Fabricate new horns using leftover Aero-Sheet. The reason for making these home-made elevator and rudder horns is to get the exact amount of differential and throw necessary for a properly adjusted contest-going plane. To make the device, take scrap Aero-Sheet strips 1" long by 3/8" wide, gluing two thicknesses together with Aero-Cement and add two more as 3/8"-sq. doublers at one end. Drill a 1/16"-hole centered 3/16" from the thin front end for the clevis connection, now jig the device in a vise to drill a 3/32"-hole centered in the 3/8"-thick rear section, perpendicular to the clevis hole. (See photo.) While still in the vise, put a couple of drops of Aero-Cement in the hole and thread a 4-40 bolt into the 3/32" hole. When the device is mounted to the control surface, it can be screwed along the bolt to adjust for the proper throw.

Now mount the 2 1/4" long 4-40 bolt in the elevator using plenty of epoxy, a blind nut on the bottom of the elevator, a large washer and nut on the top. Be sure the epoxy bonds to the wood in the elevator, not just the covering material. Do it right, and it won't fail.

The rudder horn, another bolt, is mounted to the rudder as follows: Aero-Cement a 3/8"-sq. Aero-Sheet doubler to each side of the rudder near the hinge, then drill a 3/32" hole through the doublers and rudder. Thread a long 4-40 bolt through the hole and epoxy it firmly in place. Thread the adjustable device onto the bolt and note that the clevis hole lines up with the rudder hinge line. The horn is forward of the hinge line on the elevator for proper differential.

After the epoxy has dried hard in the engine compartment, trim around the opening with a Dremel tool and sharp knife. Mount the tank behind the firewall as usual. Now hunt up the leftover windshield portion of the Pursuit top deck. Slip it in place above the firewall as an exhaust and oil barrier. Bring the fuel lines out along the sides. Pack around the top of the barrier and sides with foam rubber.

When mounting the engine, locate the engine mount holes, by putting the motor in place. Fit a propeller and spinner on it, then position the engine to leave a space of 1/16" between the rear face of the spinner or prop, and the front of the fuselage. Drill 5/32" holes and mount the motor with 6-32 bolts and blind nuts.

Your bird is looking rather complete at this stage. Stand back, you artist you, and take a good look. Beautiful, yes? No! Well, then, let's see what we can do to trim things up a little here and there. What shall it be, fancy didos, sweeping curves, eight beauties?

Continued on page 68



After trimming engine cut-out, fit motor in place with spinner and prop. Locate for 1/16" gap behind spinner. Use 6-32 bolts.

Note "windshield" from Pursuit used as oil shield. Epoxy and cloth cover inside of engine compartment for extra strength.

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SERVES YOU FOR ANY R/C NEED
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RAND



R/C MULTITESTER

A Multitester designer for RC. This Multitester is distributed by Graupner for the European countries and is made especially for them in Japan. It was selected over all others by Graupner as a top RC meter. This gives an indication of the quality and precision this identical meter now is made for Ace R/C for distribution in the United States.

DC milliammeter ranges of 100 and 500 MA
DC volts of 3.5, 7, 14, and 250 volts. Measure
resistance in 2000 ohms and 200,000 ohms
2,000 ohms per volt.

Handy pocket size. Measures 3½ by 5 by 1½
inches. Complete with test leads.

No. 22K5—Ace Multitester.....\$13.95



HEAVY DUTY NICKEL CADMIUM

This unused surplus nickel cadmium wet cell is ideal for starting or any application where "oomph" is required. It measures 2 5/8" wide by 4 1/2" tall, and is only 3/4" thick. Rates from various sources at from 5 to 7 amperes hours, depending on drain, this is a husky unit. May be charged with the Ace H-D Charger or the Dual Vari-Charger.

Each cell has been filled with electrolyte and charged—AND is guaranteed.

No. 38K72—5-7 AH Nickel Cad Wet Cell \$3.95
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No. 38K73—N/C Connector Strap, ea.....\$2.00

VOGT THROTTLE RESTRICTORS

These are a must when you want to tame the Cox .010 or .020. Simply set to position for the desired RPM and you have a tame power plant that is just the ticket for the new mini scale and semi-scale planes. Be sure to order the correct one for your engine—not interchangeable! No. 16K105—Vogt Restrictor for .010.....\$2.00
No. 16K173—Vogt Restrictor for .020.....\$2.00

The Most Exciting News in RC!

PULSE PROPORTIONAL COMES OF AGE --

Ace R/C has achieved the ultimate in single channel pulse proportional guidance systems in our new Commander series.

The backbone of the systems is a transmitter design by Don Dickerson to meet the requirements of all forms of pulse proportional radio control. Prime design objectives were high RF output, coupled with reliability, and expandability. These goals have been met.

Has extra high RF output, and the exact same RF section is used in all three versions. This output is equal to, and in a number of cases exceeds, the high priced types.

For each of the three transmitter versions (rudder only, galloping ghost, dual ghost) the pulser is different. Because the requirements of each type of flying is different, it was felt desirable to design a pulser to fit each particular need, and not attempt to adapt with a simple "hi-lo" switch or other shortcuts.

Exhaustive tests in the field by a number of R/C flyers have proven this concept to be valid. For each of the three versions of the transmitter offered, the pulser is designed to perform its specific function only!

R/O requires a pulse width ratio of 95:5, with a pulse rate of approximately 6 pulses per second. To this may be added high pulse at the user's option for the inclusion of motor con-

trol at a later date.

For Galloping Ghost a linear change in the Pulse Rate PERIOD is required—as opposed to a linear change in Pulse Rate FREQUENCY.

For Fast Rate pulse systems with dual actuators perfect linearity of the pulse width and pulse rate functions is required. An additional feature is the throttle arrangement for use with "go-around" actuators that permits retention and full control of the pulse rate function during throttle command, when used with decoders with special provisions. Beside the obvious advantage of retaining elevator control during throttle command, this arrangement permits the use of stops on the elevator actuator to prevent go-around. This permits a wider pulse rate change for more elevator power to hold the model in outside loops, etc.

The transmitter is housed in a two-tone vinyl case, and is especially temperature compensated, and has voltage regulated circuitry, not found in other equipment in this price range. The Rand stick assembly is used in all modes.

Airborne units for the series incorporate the time-proven Commander DE Superhet receiver which is backed by three years of production and design and successful operation in the field. This receiver is coupled with the proven

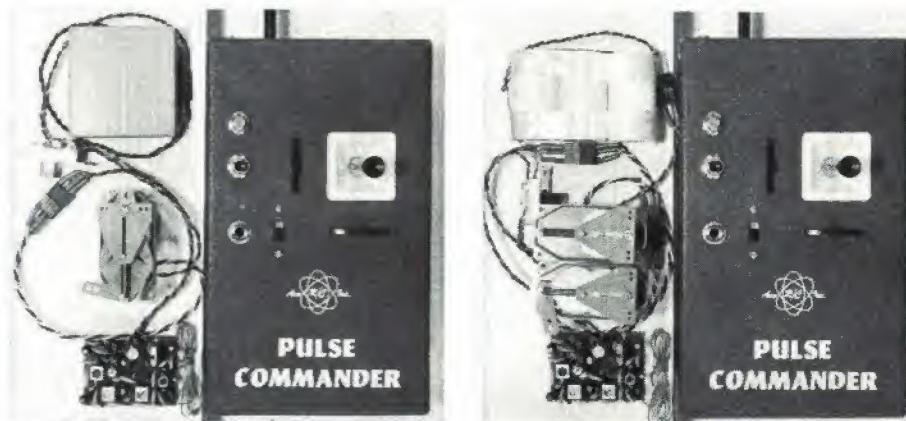
Adams actuators or Rand devices, to provide the most dependable combination of components.

The Commander Pulse series is offered in three basic versions: Rudder Only, Galloping Ghost, and High Rate Dual Actuator. This is a concept that has been much talked about, but has never before been achieved. It offers complete expandability between systems. It is a logical approach meant for the beginner and the sport flyer.

If you purchase the RO Commander, you can go to GG or Fast Rate. Once you gain confidence and experience, and want to move up the ladder, you may return your RO unit to the factory for conversion, and move up to Galloping Ghost or Fast Rate at a minimum expense. The same basic transmitter PC board is used with a minimum of changes; the same basic receiver is also used, with a change in actuator devices, and batteries.

For more on the expandability features with prices, watch our next ads. Also, watch for details in our new 1970 catalog.

The entire Commander series features ready-to-fly custom-wired and guaranteed equipment, including airborne batteries. See below for full description of each of the versions.



READ THIS ENDORSEMENT!

"Just a word to let you know how much I've enjoyed flying your Ace Commander Rudder-Only package in our Ranger 42. Your new transmitter has ground range like I've never seen before. And the range in the air is complete—so I can tell what the model is doing.

"Also, the way you're packaging the system should make it easy for the novice to get into radio control, and I hope a lot of them get the word.

"All Good wishes,
Carl Goldberg"

COMMANDER R/O PULSE PACKS Ideal for Beginners and Sport Flyers

Rudder-Only has been proven to offer the most fun and satisfying experience per dollar invested of any of the R/C systems available today. Now, with the new Commander R/O Pack you are assured of the fact that you can start with simple rudder only, and at a later date upgrade your equipment to Galloping Ghost or Fast Rate Decoded systems.

The R/O Packs feature the Dickerson transmitter described above with the Rand single axis stick, and the Commander DE 2.4 volt superhet receiver. Has an Adams actuator of the size of your choice, depending upon your aircraft, with nickel cadmium batteries wired with an on and off switch. AND each pack will save you \$10.00 if you bought the individual items separately.

The R/O Baby is for .010 to .020 jobs, has two 225 MA nickel cadmiums, and the regular Baby Adams actuator. The airborne weight is 2.5 oz.

The R/O Standard uses the LV single Adams actuator for more power for .049 to .07 size. Uses larger capacity nickel cads. Airborne weight is 4.5 oz.

The R/O Stomper used the LV Twin Adams actuator for up to .15 or can be boosted for use with .19. Airborne weight is 4.9 oz.
(Charging equipment extra)

No. 10G15—Commander R/O Baby \$69.95
No. 10G16—Commander R/O Standard 71.95
No. 10G17—Commander R/O Stomper 74.95
All 27 MHZ, except 27.255. Specify.

COMMANDER GHOST PULSE PACK Provides Rudder, Elevator, Motor

Using the same basic Dickerson Transmitter but with two axis stick control, the Ghost uses pulse width and pulse rate and full on-off for control. This system has provided many modelers with an exceptional degree of control for a small investment of money.

The receiver is a new Commander SE designed specifically to feed into a Rand GG Pack with 3.6 volt nickel cad supply. This system should be used in planes of .09 and up.
(Charging equipment extra)

No. 10G18—Commander Ghost Pack \$109.00
All 27 MHZ, except 27.255. Specify

COMMANDER FAST PULSE PACK Retains Elevator During Motor Signal

The system here is an electronic decoded one which allows a much faster pulse rate to be used, and the rudder and elevator quiver slightly. You have FULL control of elevator response on motor command (full on or off)—An Ace EXCLUSIVE! Because two actuators are used, the system is useable in ships up to .29 size.

Receiver is a new Commander SE, Rand Dual Pak, with 1 amp 3.6 V nickel cads.
(Charging equipment extra)

No. 10G19—Fast Pulse Commander \$139.00
All 27 MHZ, except 27.255. Specify

NEW HANDBOOK-CATALOG For the Fun Flyer and Tinkerer

ACE RADIO CONTROL • BOX 301 • HIGGINSVILLE, MO. 64037

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Our Handbook-Catalog is bigger and better than ever. More items for the do-it-yourself, the tinkerer, the fun flyer and for the BEGINNER; more products from most R/C manufacturers as well as many Ace R/C exclusives. HANDBOOK section has been acclaimed as the "Bible" of R/C. It's a MUST for R/C editors. Price is just \$1.00 plus shipping and handling. Completely refundable on your first order! And that order also puts you on our mailing list for our R/C DATA Service—acclaimed the world over! You can't lose—send your buck on a round trip today. It could be the best dollar you ever spent.

Important: For overseas delivery on catalog or Binder please add 50¢ for additional postage.

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Guaranteed delivery anywhere. Orders over \$5.00 sent prepaid. Orders under \$5.00 please add 50¢ for postage and packing.



Even with its two engines screaming, model flies rather slowly, kept aloft by its high-lift wing section. Always start outboard engine first so that when it stops, the inboard engine is maintaining

line pull. Glide is good, so landings can be gentle. British-built plane is popular, light STOL transport. With turboprop engines, it carries almost anything or 18 passengers.

SCALE CONTROL-LINER

SKYVAN

Short Brothers STOL cargo plane is all-balsa box with wings. Uses two 049 engines.

PAUL H. SCHAAF

"HONEY, it's fat!"

"Dear, it's supposed to be like that since it is a relatively low-cost cargo and passenger plane with STOL capabilities that is used around the world."

"I don't care, it's fat and I don't know why you want to build it."

My wife and I were having a fit for tat, the result of my announcing that I would like to build a model of a plane I had seen a photo of in *Flying* magazine, the Short Brothers "Skyvan."

I thought it best to bring the episode to a conclusion, so I marched over to the trap door that opened to the wet, moss-laden stairs leading to my cellar laboratory, where I do my thing. Once there, my program stopped before I began. How was I to build a plane, with no plans or plastic models available.

I decided to write Garrett-Airesearch Division of Arizona, who pictured the plane in their motor ad. They kindly forwarded my request to Remmer-Werner, Inc. of St. Louis, U.S. agents for Short Brothers Skyvan, who generously forwarded 3-view plans plus beautiful colored photos, and also advised me that the plane was made by Short Brothers & Harland, Limited of Belfast, Ireland. I wrote to Ireland and shortly thereafter, received much interesting literature regarding the plane.

The Skyvan originally was made over ten years ago, but its appeal was limited due to underpowered engines. Since adapting the Airesearch's Turboprop engines, the plane has come into its own, and is now being used in the remote corners of the world for cargo and passenger work. The model's tremendous weight-lifting capacity, good range, and practical STOL characteristics, make it quite unique and successful in its design application. It has a span of 64 ft., length of 40 ft., range of 570 miles carrying

approximately 3000 lbs. of cargo or people. Short Skyvan can carry 4000 lbs. at a shorter range of about 250 miles. For passenger service, 18 seats can be provided. One very practical feature, the rear cargo door is practically level with the ground for quick loading and unloading.

Fuselage: Although it looks difficult, the fuselage is easy to construct, since it is basically a box section. It has a constant width from front to rear. We make it in two sections. The nose portion is made up of cemented balsa blocks and $\frac{1}{8}$ " sheets and the section behind the nose portion made of $\frac{1}{8}$ " sheet balsa.

Rear section: Cut the side panels from $\frac{1}{8}$ " sheet as illustrated. Cement $\frac{1}{8} \times \frac{1}{8}$ " balsa strips along the length $\frac{1}{8}$ " in from the edge. This provides a reinforcing ledge for the top and bottom $\frac{1}{8}$ " balsa sheet panels and also provides stock to the fuselage, to radius the edges.

Slot the side panels in the rear for the stabilizer and also provide the cutout for the $\frac{3}{8} \times \frac{1}{2}$ " balsa block that makes the extended flange landing gear.

Please note three balsa sheet formers that help hold the fuselage together. We have to provide cutouts in the rear ones for the elevator pushrod. The bellcrank support is made of $\frac{1}{8}$ " plywood having triangular gusset plates in the underside, which connect to a $\frac{1}{8}$ " balsa sheet reinforcement plate on the right side of the fuselage, where the leadout wire strain exists. This reinforcement plate can be made larger than the plans indicate, if you wish to do so.

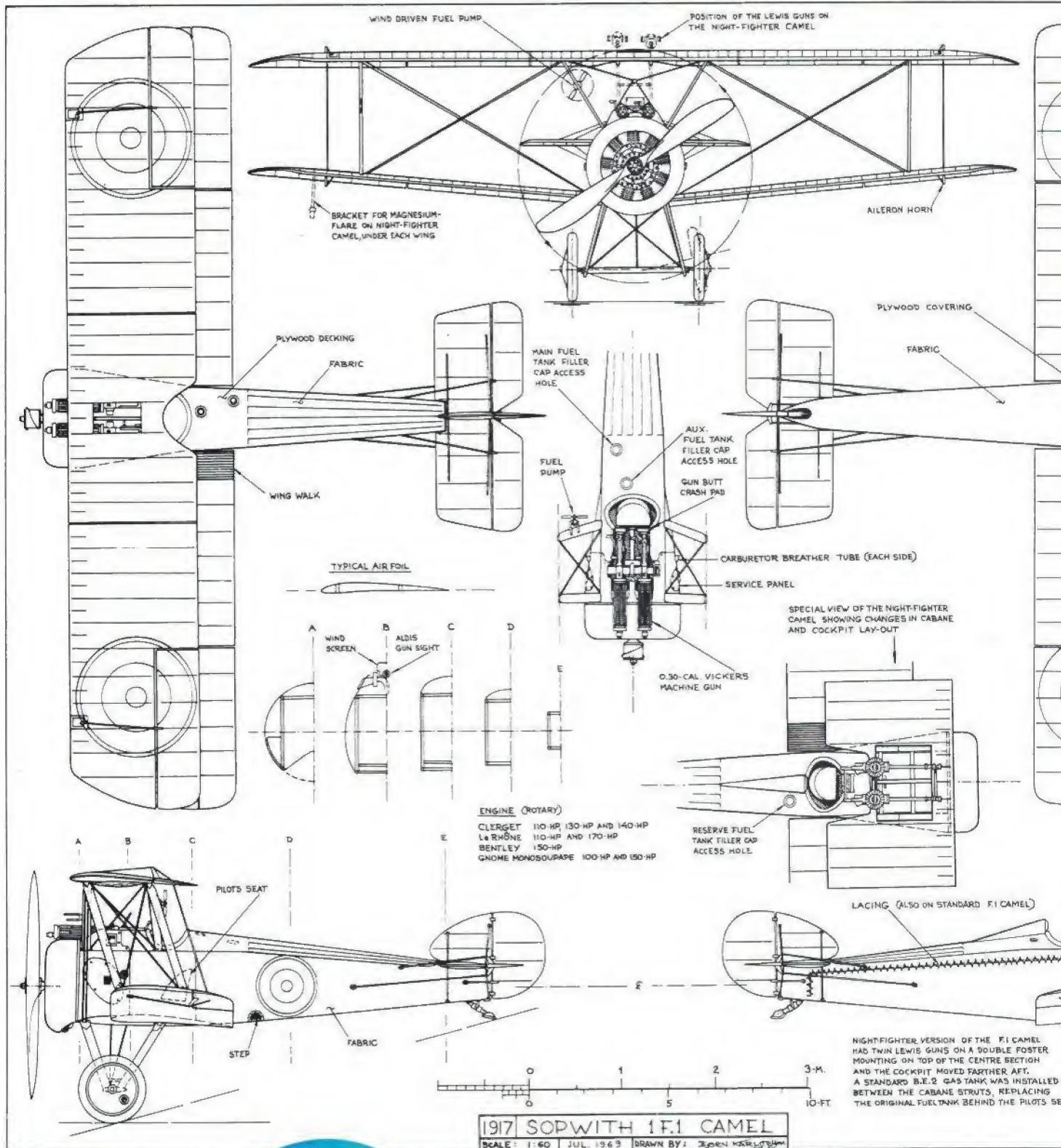
The top and bottom panels can be added after the bellcrank mount, pushrod, etc. have been added to fuselage. Please note the bulbous section over the wing and fuselage is constructed and assembled after the wing is cemented into position on the basic fuselage. This is detailed later in the

article. We provide a short former made from $\frac{1}{4}$ " balsa sheet as a wing platform for the trailing edge only. It is noted "D.B." on the plane for clarity. We also add on top of each of the side panels in the wing area "incident blocks," so the wing will set on a solid surface at the incidence angle. Block tapers from $5/32$ " in front to 0 inches at the rear. They are noted on the plans.

Front nose section: The extreme front of the nose section is made of a solid balsa block to provide strength and support for the front landing gear. This landing gear is made very easy by cutting, drilling, and grooving a $\frac{1}{4}$ " dowel to accept the formed $1/16$ " music wire landing gear. Then it is cemented and thread wrapped in position. The assembly is then pressed and cemented into a $5/16$ " diameter hole in the front nose block. The rest of the section is constructed by adding $\frac{3}{8}$ " and $\frac{1}{4}$ " balsa sheet to the front block so it forms the shape we desire. We want most of this area hollow, so the plane does not become too nose heavy. I cut out the walls to approximately $\frac{1}{4}$ " thickness. On top view we have dashed in how the sheet balsa forms the shape of this section.

Main landing gear: This has been engineered literally to hold up a house. The strength came accidentally, since we had to develop a simple method of copying the prototype. We decided to use a balsa wood block $\frac{1}{2} \times 3 \frac{3}{8} \times 8 \frac{5}{8}$ " long. On the ends are cemented the vertical panels made from $\frac{3}{8}$ " sheet balsa. Please note they angle in slightly with a protruding section slightly above and in front of the wheels. The landing gear wire is $1/16$ " diameter music wire, which is formed to lay into a groove in the $\frac{1}{2} \times 3 \frac{3}{8}$ " balsa block, then angles down and out at the ends. A clearance slot is provided in the $\frac{3}{8}$ " vertical panels above the wire

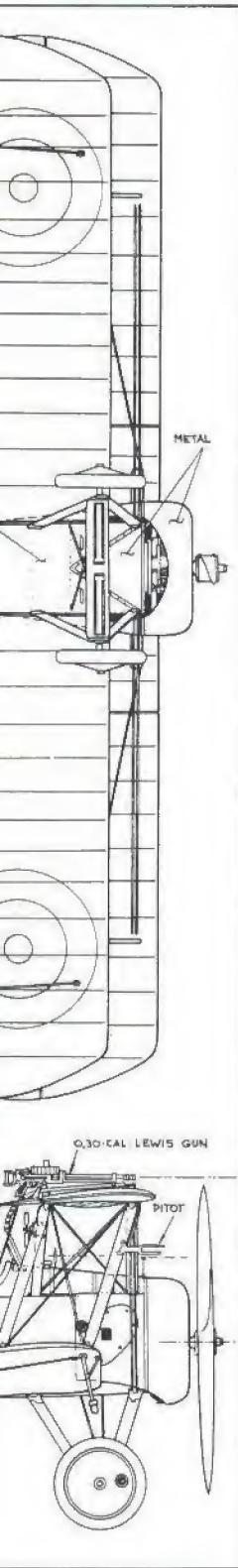
Continued on page 50



SOPWITH F.1 CAMEL
1917-1918

The Sopwith Camel was the first British type to carry twin Vickers machine guns, closed in a "hump," which gave the Camel its name. It was a highly maneuverable aircraft which could out maneuver any contemporary airplane if flown by a skillful pilot, with the exception of the Fokker Triplane. Its amazing agility was partly due to the weight of the engine; on righthand turns the nose tended to drop; on lefthand turns finished in a fatal spin.

Units operating night-flying Camels, found that gun flashes were a serious hazard. A night-fighter version was devised, with guns atop the wing center-section, and the cockpit moved aft. A standard B.E.2 gas tank was installed between the cabane struts, replacing the original fuel tank behind the pilot's seat. From July 1917, when they reached the front, until the Armistice, the Camels downed more than 1294 enemy machines.



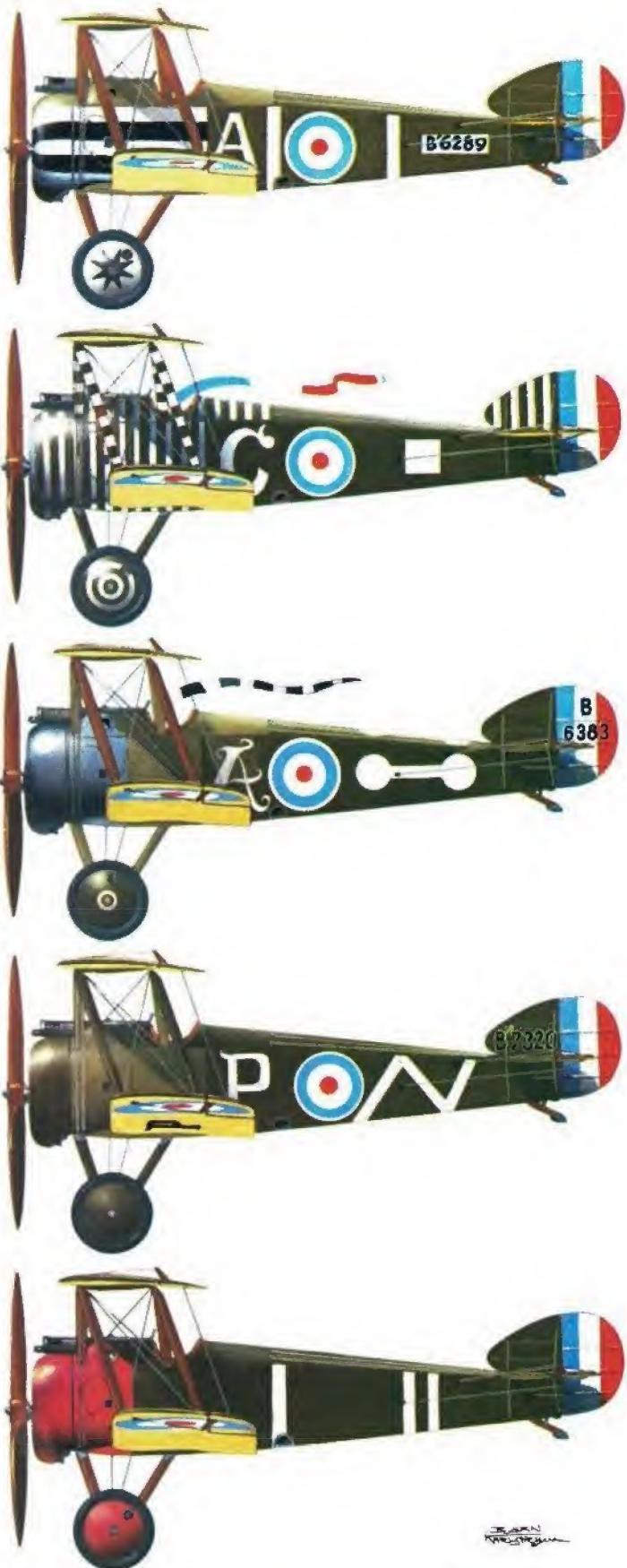
No. 10 Squadron RNAS (Royal Navy Air Service) was equipped with F. 1 Camels from end of August 1917. For a brief time they bore striped noses ("A" Flight, white and black; "B" Flight, white and red; and "C" Flight, white and blue) and individually decorated wheels. The extravagant decoration was ordered removed by the Wing commander as soon as he saw it.

Camel F. 1 from No. 28 Squadron RFC (Royal Flying Corps) operated in Italy from end of 1917. Aircraft "C" was flown by Flight Commander Captain Wilson. Ten-foot streamer on each rear wing strut.

Camel F. 1 from No. 45 Squadron RFC, also based in Italy 1917-1918. Aircraft "A" of "A" Flight was flown by Flight Commander Captain MacMillan. Twin streamers. "A" Flight aircraft were marked "A-F"; "B" Flight, "G-M"; and "C" Flight, "N-S". A, G and N were flown by Flight Commanders.

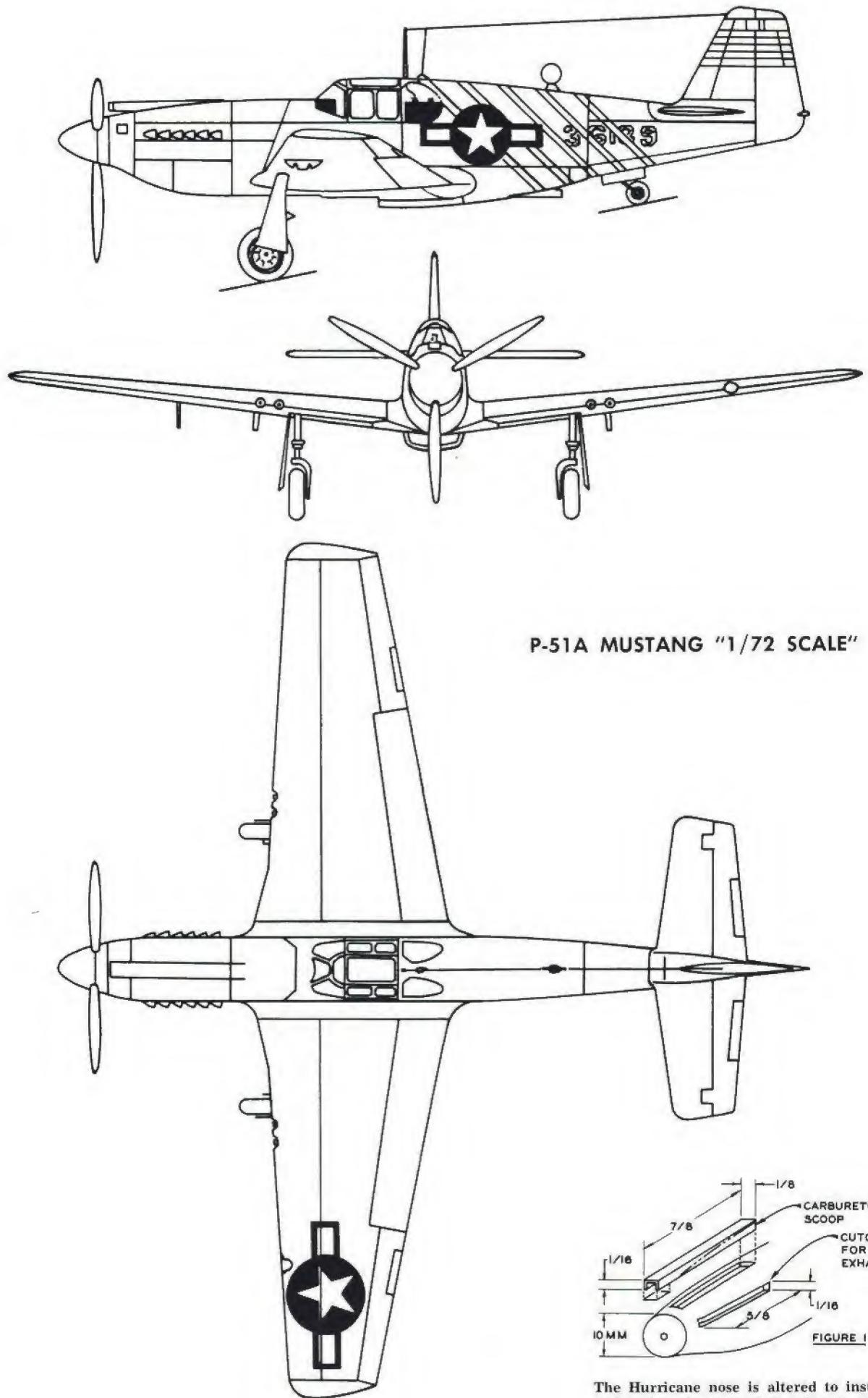
Camel F. 1 from No. 70 Squadron RFC. Aircraft "P" was flown by Captain Todd. Top and bottom view below. The zig-zag unit marking was used July 1917, March 1918. Thereafter replaced by three vertical bars.

The famous Bentley Camel of N. 209 Squadron RAF (earlier No. 9 Sq. RNAS) flown by Captain Roy Brown in the combat in which Rittmeister Manfred von Richthofen (the Red Baron) was killed on 21st April 1918. Top view below, right.



ers guns. Their breeches were en-
emy, temperamental little biplane
by an experienced pilot, possible
to the torque effect of its rotary
turns to rise. Uncorrected tight

cylindered pilots. A modified night-
on. A total of 5,490 Camels was
istic, they accounted for no less



The Hurricane nose is altered to install a carburetor air scoop and exhaust system.



SCALE TECHNIQUES FOR THE PLASTIC MODELER

P-51A Mustang

Grafting nose section of Hurricane kit to P-51B kit makes accurate version of original Allison-powered Mustang.

RICHARD MARTIN

IN 1944, the late General Orde C. Wingate decided to lead a second, and larger, expedition into Burma. An air commando force was visualized. Allied ground forces were to be flown into Burma, completely

supplied and supported by air. Chosen to lead this air commando force was an aggressive young fighter pilot, Colonel Philip G. Cochran. His mount was the P-51A Mustang, Allison-powered forerunner of the much more famous Merlin-powered P-51 B, C and D Mustangs.

Although much tribute has been paid by the plastic kit manufacturers to later versions, no kit of the P-51A is available.

Our conversion from the P-51B to P-51A is to $\frac{1}{72}$ scale. It could also be carried out effectively to $\frac{1}{48}$ scale with the larger Monogram P-51B and Hurricane kits.

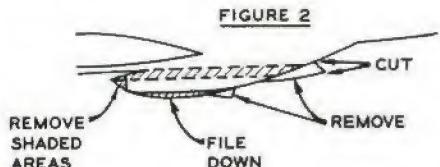
To build the P-51A in $\frac{1}{72}$ scale, you will need one Monogram P-51B and one Frog Hurricane kit. Also, a pair of exhaust stacks will have to be taken from another Allison-powered fighter. We used a pair from an

already cannibalized Frog P-40, thinned to fit.

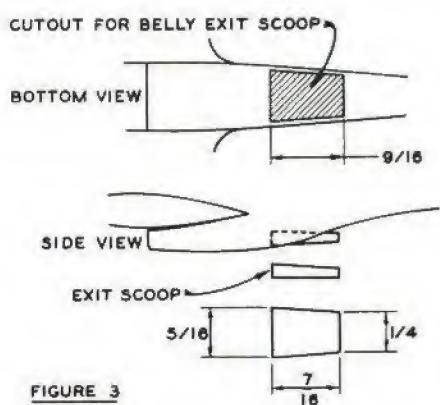
Begin by assembling both the P-51B and Hurricane fuselages halves, using cement from the exhaust stacks forward only. Set this aside, and turn to the wing assembly. To avoid the empty look in the wheel wells, you can cut a section of $.010"$ -thick plasticard slightly larger than the wheel well cutout and cement this in place as the first step. Another touch is the use of hypodermic needle sections as machine guns. If you're doing this, put a dab of putty on the inside of the bottom wing section, about $\frac{1}{8}$ " behind the machine gun ports, before assembling the wing. Glue the wing tops to the bottom.

Remove the nose sections from the two

Continued on page 62



Saw section out of air scoop to make smaller early-model Mustang scoop, then file and shape.



After shaping new air intake, cut out and install the air exit made of plasticard.



Prior to painting, model was wet-sanded to remove rivet and skin lines. Wing-fuselage joint also was smoothed. Note belly air scoop shape and cooling-air exit position.

GETTING STARTED IN R/C

Trimming a Rudder-Only model.

HOWARD McENTEE

SOME kits and mag articles for rudder-only models give trimming and flying instructions. Many don't. Some just suggest that the novice have his new craft checked and test-flown by an expert. Fine advice. But what if no expert is available? Here are some helpful hints.

First, if you are inexperienced, don't make changes in the model; build it exactly as specified. You can try your own ideas when you have experience. Check wing angles carefully, make sure the CG (center of gravity) is located as specified on the plan, with the engine, prop and all radio equipment aboard. If it isn't, perhaps you can shift the receiver, battery, or both, to attain the specified balance. Add weight only as a last resort. CG is generally specified with no fuel.

Check the engine thrust-line. Many models require thrust-line offset. If required, this generally will be right-thrust (prop points slightly to the right, to compensate for engine torque); down-thrust (prop pointed slightly downward, which counteracts tendency of some planes—especially high-wingers—to nose upward when the engine is running); or both. Be sure your engine is well broken-in before you try any flying. An engine which is too tight may quit abruptly shortly after launch, which can have fatal consequences!

Check radio action carefully. With all equipment in place, and the antenna extending out the fuselage side to the tip of the stab or rudder (use string if it is short, let excess dangle if too long). Try a distance check, with antenna up all the way; you must get at least 200 yards ground range. Check radio action with the engine running at closer range but with the transmitter antenna fully collapsed. If the radio is erratic, you have metal-to-metal contact causing "noise." Use nylon linkage at engine. Avoid metal-to-metal works at the rudder. Don't use full length wire pushrods between servo and the rudder or elevator.

If all above tests and checks turn out O.K.,

you are ready for test glides. Test gliding is usually not possible with large power planes—you just can't launch them fast enough. But it is still the best way to check trim of smaller rudder-only craft. Needless to say, such glides should be made, if possible, where the model can land in tall grass or soft weeds. The first landings are apt to be rough!

It's just as well to make the very first test glides with radio turned off, rudder centered. Grasp the fuselage under the wing (assuming a high wing monoplane) and launch the plane at a slight downward angle—not level, definitely not upward. The plane glides with nose a little down, and that's how it should be launched. We suggest the modeler run with the plane in his hand, and give it a weak throw when it feels a little "light." Don't give the model a mighty heave. That makes it climb steeply, stall, and drop like a rock! When you get the hang of it, you can begin to check the model for proper glide angle.

If a model which has been correctly launched glides in a series of swoops or scallops, it generally needs more nose weight. If the stab is adjustable, (perhaps attached to fuselage with rubber bands), either raise the leading edge slightly, or lower the trailing edge, then try several more glides. The best glide is flat and with no up-and-down undulations. However, it should be reasonably long. A sharp dive toward the earth means you need less nose weight (or stab angle should be changed by lowering the LE or raising the TE).

If you have a hill of modest height, you can test glide with the radio working. At first, apply turn only slightly or briefly, and note if the plane responds. It might respond sluggishly—many planes do when not flying under power. Try again with longer or sharper turns, but hold turn signal only briefly. Don't try to turn sharper than 30 degrees or bank steeper than 10 degrees.

Now you are ready to try power flight.

Generally, it's best not to make early flights with full power. Use only enough thrust for a "power glide." You can cut engine power by running the engine rich (needle valve opened considerably from peak setting). Another good way to cut thrust is to put the prop on backwards.

If you have enough open space, early flights with a very gentle climb are the next step. Let the model climb to a fair altitude before sending any turn signals, then send them gently (with proportional rudder) or briefly (with escapement or single-channel servo). Increase power slightly and climb a bit higher each flight so that then you can hold turns longer.

The basic method of adjusting a rudder-only plane is first to get the glide smooth and flat (by stab adjustments, or by shifting weight). If the plane turns in these glide tests, you will have to compensate by setting the rudder for opposite turn (do this by mechanical adjustment of linkage, not by radio). With the glide as good as you can get it, trim the model for straight power flight by shifting the engine thrust-line. More down-thrust if it seems to climb excessively, more side-thrust to counteract turns.

Your goal is to have the model fly straight both under power and in the glide, but to have a moderate and smooth climb under power. If the model appears to be climbing too high, hold it in a turn. Turning will cure excess climb and, if you hold a turn for a longer time (this time varies widely with plane design, speed and trim) the nose will drop to start a "spiral dive." This builds up speed at a surprising rate; excess speed gained in a spiral dive can be used to perform loops, wing-overs and other stunts with a rudder-only plane. You may need opposite rudder to come out of a turn if the model does not do so by itself.

These suggestions may seem over-cautious. But if you've had no previous experience, take it easy, and your new pride and joy will last a lot longer.



Trainer-type models need not be boxy or unattractive. This is Roulet, AAM, Feb. '67, good for rudder-only learning on a 15.

JANUARY 1970

MODEL AVIATION

Official magazine

A.M.A. NEWS



Academy of Model Aeronautics • 1239 Vermont Avenue N.W., Washington, DC 20005

INTERESTED IN JOINING A.M.A.? Over 27,000 did in 1969. Membership details may be had by requesting FREE BROCHURE from above address.

St. Louis Control Line World Champ Team Finals

By Dr. Laird Jackson
Program Administrator

"Doc" Jackson, an active CL competitor himself, accepted the duties of Program Administrator for selecting the 1970 U.S. Control Line World Championship teams for Speed, Stunt and Team Racing following the resignation of the original administrator at a time when the program was already in motion. He was manager of the 1966 CL World Championship teams. He currently also serves as chairman of the AMA Control Line Contest Board.

The Team Finals for selection of the 1970 U.S. FAI Control Line Teams were recently held over Labor Day weekend in St. Louis, Mo. This is the big event for a small handful of hard-working, dedicated control line flyers. These guys started just like the rest of us—with beat up stunters, ragged combat jobs or speed ships that wouldn't get out of the dolly. By dint of hard work and years of experience (I hate to admit how old some of the speed flyers are) they were ready to go for 12 highly desirable awards—places on the 1970 U.S. FAI Control Line Teams.

But let's go back a bit—an event like this takes a lot of advance planning. At least that's what I thought when I inherited the job from Steve Wooley in mid-July. I thought it was so advance that it must already have been done—so I did very little. Fortunately the meet was saved by the tremendous organization of modelers in St. Louis headed by Art Schaefer and his merry band of Yellow-Jackets. There was a mild crisis with stunt judges due to illness in one judge's family, but we pressed John Blum into service, and he, LeRoy Gunther and Tom Niebuh did a yeoman job for us.

So, on Friday before Labor Day, we descended on The Ramada Inn in E. St. Louis. You know the scene: dusty station wagon drags up to the front door trailing kerosene and ether fumes (diesels ya know) with 20 odd wings, stabs and assorted pieces visible in back atop tool kits; and 7 greasy, fagged, bearded, slightly tawdry looking types drag out and accost the desk girl who shrinks back in horror. Anyway they gave us rooms as it is illegal to discriminate, and we unpacked and hustled out to Buder Park for practice. There we found practice actively going on, and flying was busy all day with all three circles going until dusk. Stunt flyers never get enough flights to make pat-

terns perfect, and speed and team race men always have another setting to try or a change of prop or cylinder head or plug or what have you.

There were a lot of motel rooms busy with last-minute preparations that night, but everyone was ready to go at 8 am Saturday for processing. Stunt goes pretty fast, but team race and speed processing means checking wing and stab area measurement on two ships each for every flyer or team as well as fuselage area and pilot

size for team racers. Engines were also marked and recorded to avoid passing a 'hot' one from one ship to another. This was all finished, and flying started, at 10 am in the circles. In the Team Finals all World Championship rules were used for stunt, with maneuvers scored with a difficulty factor, and the total of the flyer's best two flights determined his score. In speed and team race we emphasize consistency by using the best two of four speed flights and averaging these for a



Laird Jackson photo



Laird Jackson photo



G. B. Telfair photo

Upper photo shows U.S. team for the 1970 Team Racing FAI World Championship: Barr/Theobald, Dunkin/Wright and Albritton/Maryin. For the first time U.S. TR teams all had averages under five minutes. Speed team spots were taken by Bill Wisniewski, John Newton and Arnold Nelson, shown in photo at left. Speed models in the Team Finals all were flown with two lines in accordance with current FAI World Championship rules. The photo at right shows the CL Stunt model which won a team spot for Bill Werwage. Other Stunt team members are Gerald Phelps and Bob Gieske. The FAI Stunt pattern is the same as the AMA pattern; however, scoring is weighted by a difficulty factor—most points for good execution of the most difficult maneuvers.

score. In team race we fly six heats, rotating the team pairings, and discard the single best race and the two poorest, leaving us with three heats to average. This gave us a busy Saturday in stunt with two rounds, but only one round on Sunday. In speed and TR we had three TR rounds and two speed rounds each day.

The stunt flying was tight, as it usually is, and only 300 points separated the first 10 places—a 6% difference! Less than 1% points separated the first two places. I had the least opportunity to actually observe the stunt flights, so my impressions are not very conclusive. I watched some of the early flights by the Adamisins, and they were having troubles and talking to themselves. Lew McFarland was flying a little smaller ship than the one he used at his last World Championship, and although he looked very smooth to me, he just barely finished out of the money. Bob Lampione appeared to be struggling to regain his Nats winning form, but had a few too many rough edges. Jim Silhavy had a little bad luck with an engine overrun and dropped from the top ranks. Of the three team place winners I saw only Bob Gieske fly a complete flight, and he was consistent and smooth as usual. Gerry Phelps is a left-hander who flies clockwise and did almost everything right those two days to come out on top with a score of 4881. Bill Werwage has always been a topnotch flyer who has just missed several previous FAI teams. I was especially glad to see him make this one.

Speed flying in FAI has an almost exclusive group of devotees. Most people seem to think it is unnatural to run a speed engine without nitro or something. I think the new two-line rule and K&B engine availability (with pipe) will change that, and the next team program will see more participants. Anyway the old standbys were there—Wisniewski, Nelson, Nightingale and Lee all had Civil War hats they claimed were originally government issued to them personally—their speed times were pretty close. Everybody but Carl Dodge used a TWA 15 with a tuned pipe. Carl had his own engine, developed together with Al Stegens from a Craig Ascher case. Everybody was getting good ground RPM's, but in the air they were having their troubles. The two lines slow things down 12-15 mph over the old single line, and there were a lot of engines that didn't want to get up on the pipe and run. They would just about, but not quite, break into a harmonic; adjustments to get them there would usually end in an over-lean run. After the dust settled, John Newton had the only 140-plus flight, and it gave him the best two-flight average of 139.17. Bill Wisniewski started strong and got slower and slower, but stayed up high enough to get second. Arnie Nelson started poorly and came on later with two consistent flights to get third. Jim Nightingale was 4th again, as in 1967, with Glenn Lee close behind. Carl Dodge had a great deal of engine setting trouble but recorded a single flight that was up with the leaders, showing he will be tough next go round.

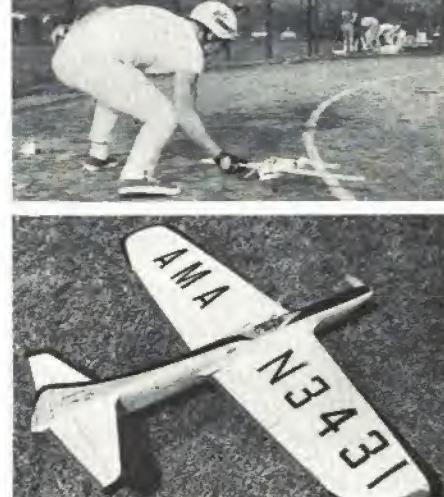
Team race is probably the premier event at the FAI World Champs because of its obvious spectator interest. Therefore, the competition for team places was especially good this year. Stockton and Jehlik, 1968 World Champions, were there despite a long layoff; everyone was waiting to see if that had hurt them. Several new teams were there and were eager to test themselves against the veteran competition. It was good to see Ed Wallace and Tim Zimmer, two young guys from the midwest, in there trying for their first shot. They had as good a speed as anyone and generally had good restarts.

They need polish in their pit techniques and have to sew up a few loose ends, but they proved that the newcomer can get in there and compete. More competition experience will make real contenders out of them.

Most teams were going for 35 laps or so at speeds in the low to mid-90's and two-stopping the 100-lap race. A few had trouble getting 35 laps and so had to three-stop and hope for better speed. Only S and J and 'the kids' John Marvin and J. E. Albritton had the potential to make over 50 laps and thus complete the race with only one stop. Dunkin and Wright were hampered by a wipe-out of their old number one ship and started off at a disadvantage. They overcame this, though, and returned several good consistent heats to take third with a 4:55 average. John Barr stayed loose often enough to keep the Barr-Theobald team's new boost-port diesels running right and earn them a solid second position with a 4:50 average. Roger (Theobald) is a semi-schizophrenic pilot as he has one eye on the ship and one on the 'friendly' team race jury at all times. Art Muser, Al Stegens and myself kept things pretty honest at all times, but Al usually gave Roger a foul flag or two for comradely feeling toward the end of each heat. The kids were the class of the competition as they reeled off heat after heat in the 4:40's or 4:30's. It was obvious that they had good equipment and were very confident with it. They should be very tough next year at the World Champs. Stockton and Jehlik unfortunately showed a few rust spots from the layoff and had one piece of bad luck after another to finish out of contention in 5th. Harness and Wildman, the West Coast 'kids', came in a solid 4th and would have been on the team with a break or two.

Trophies and team places were announced by 4 pm on Sunday, and the crews headed out for motels or home. The St. Louis club members gathered their equipment and headed home. Without them this meet just couldn't happen, and nobody can say that often enough or loud enough. The team members are all good, and I think we are in solid shape for 1970. The stunt men are top-notch as usual, and the team race team is our first with all 4-minute averages, giving us our best shot yet at the team championship. The speed team is as

Laird Jackson



G. B. Telfair

CL Team Finals Scenes: Pete Brandt, upper L, makes good pit stop for TR model piloted by Danny Jones. Arnie Nelson, upper R, checks speed props with adjustable pitch gauge. Shark 45 model of Lew McFarland, above L, placed 4th to barely miss team spot. Nats Stunt winner Bob Lampione, above R, scored 4613 points to place 8th in the Team Finals, just 268 points down from first place. Special FAI Trophies, sponsored by K&B Manufacturing for Speed Top Flite Models for Stunt and World Engines for Team Racing, were awarded to CL Team Finalists.

good as ever, but I fear we won't have as much of an edge on the Czechs, Hungarians, Russians and Italians as we enjoyed in 1966 or even 1968. But competition is the name of the game, and that is why everybody came to St. Louis. For those controlliners amongst the readers who have never been to an FAI Team Finals, you ought to try to make the next one. It is a pleasure just to be there and get to know these guys—besides, you might even win a trip to Europe!

Too Late to Renew AMA Membership without Losing Service, Magazines?

December 15 is the critical deadline. Owing to the publication lead time, the very least to be expected for members renewing after this time is that their March *American Aircraft Modeler* will reach them late. This is because the March issue is mailed in January, and the address tapes of AMA members are prepared for the publisher during the latter half of December. Late copies, to those renewing between December 15 and January 15, will have to go out via a supplementary mailing in late January. Furthermore, should you delay in signing up for 1970 membership beyond January 15, you will completely miss the March magazine, because AMA copies have to be ordered by that date.

The February *AAM*, which is printed and mailed in December, is the last magazine to be mailed to 1969 members—all 1969 AMA memberships expire December 31, 1969.

Renewal notices were mailed to 1969 members in early October. Any AMA member who has not received his bill for 1970 dues by the time this issue reaches newsstands should notify AMA HQ immediately.

Thinking of joining AMA for the first time? Right now is the best time to join because by joining now you will receive maximum value—12 issues of *American Aircraft Modeler* plus AMA benefits during each month of 1970.

Laird Jackson



Laird Jackson

Legal Aspects of Model Airplane Noise Complaints

Preface. One of the underlying gnawing concerns that confronts all modeler activities is the possibility of private or public noise complaints. This problem is aggravated by the fact that the average modeler or model club has a very limited legal budget, if any, for defending these complaints. The local lawyer who would be retained to defend such a complaint, furthermore, is normally not well informed about modeler activities. The costs of educating the local lawyer with respect to the public interest aspects of modeler activities, and in his related research into the applicable law, would therefore be quite heavy.

HQ has accordingly arranged with the AMA General Counsel to prepare a Memorandum of Law for the benefit of all modelers and clubs against the day they may have to contend with a private or public noise complaint. Our counsel and his staff will also keep an eye out for all new cases in this area of our interest, and a supple-

ment to the memorandum will be prepared as any new cases warranting discussion arise and are decided.

The position of the modeler in defending a noise complaint is not hopeless. It does, however, require careful presentation; and, in order to keep any local legal bill within manageable limits, it is necessary to supply as much as possible of the facts and applicable case law to the lawyer selected to defend the noise complaint. The Memorandum of Law has been prepared with these objectives in mind.

There is a scarcity of decided cases, squarely in point, in this area of the law. We therefore request that all legal developments in this area be promptly reported to Headquarters so that the results may be reviewed by our counsel and ourselves.

The information following is excerpted from the Memorandum of Law. It includes the basic points but represents only about 25% of the complete work. Omitted are descriptions of specific cases and the section

which documents the benefits and public interest factors which are vital to the justification of model aviation activities before legal and governmental bodies.

The latter section alone will also make an effective presentation piece for modelers seeking flying sites or otherwise attempting to show that their activity is more than merely a recreational or hobby pursuit. The documentation includes endorsement by prominent people and the relationship between modeling and national problems of education and shortages of technically inclined youth.

The complete memorandum has been provided in booklet form, without charge, to AMA officers and to chartered clubs. Additional copies are available for \$2 (send check or money order) from: Academy of Model Aeronautics, 1239 Vermont Avenue, N. W., Washington, D. C. 20005. Copies of the section on Public Interest Factors of Model Aviation are available separately for 50¢ each, or 10 for \$3.00.

MEMORANDUM OF LAW ON MODELER NOISE COMPLAINTS

The Problem and the Law

This memorandum is designed to explore and discuss (1) the legal rights of modelers to fly their planes despite the fact that the resulting noise may be disagreeable to others; (2) to recommend possible courses of action to take in response to a noise complaint; and (3) to act as an aid to any local attorney retained in the event that a local club is challenged in the use of its flying field because of the noise. By furnishing the basic legal research, case citations, facts, and suggested tactics, to reduce the amount of time and labor that the local attorney would otherwise have to expend on such a case, he may be able to represent the local club at a fee within the usually limited legal budget of the club.

There are two possible law suits which may develop if a nearby property owner attempts to seek legal means to stop the noise. One type of action would be a lawsuit instituted by the city or county against the local modelers' club to stop flying the planes because that activity on that particular property was unlawful. If the modelers wished to contest the decision (as they should in most cases), the

facts would eventually be brought before the appropriate local government official. If the city had passed some law or ordinance (such as zoning or anti-noise), which prohibited such an activity as modeling on the property in question, then a lawsuit could be instituted to enjoin the modelers from conducting their flying operations.

However, just because someone swears out a complaint with the police who then request that the flying be stopped does not mean that modelers would necessarily have to hire a lawyer and go to court to have a judge settle their rights. It is entirely possible that the complaint would be dismissed upon an initial finding by the local authorities that no law is being broken.

A second type of suit which might develop is a private civil suit with the disturbed landowner as the plaintiff suing the modelers (or the local modelers' club) as defendant. The theory of this lawsuit would be that, although the flying might not violate any public law, it does violate the landowner's private rights due to his ownership of his property.

The problem of the complaint to the police is the one with which modelers are chiefly concerned. This is because it takes little effort (and no money) to simply call the police or swear out a com-

plaint. On the other hand, there is considerable expense involved in privately hiring a lawyer and going to court.

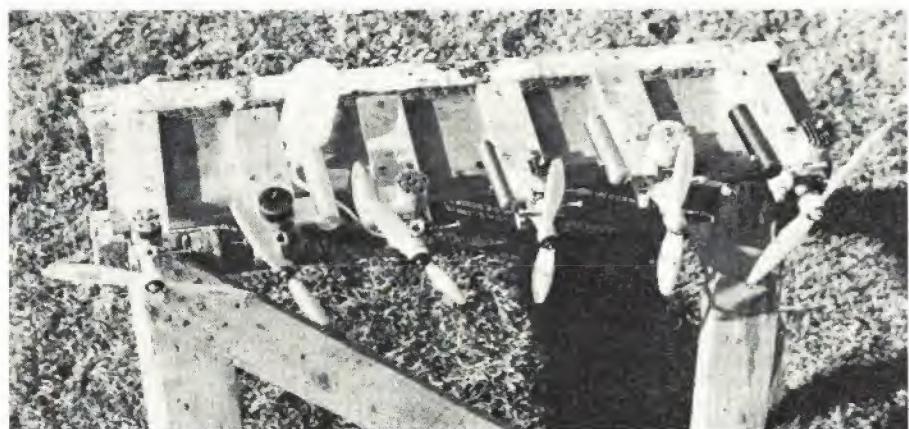
The private nuisance type of lawsuit will be considered at length, however, because this type of action is decided on the basis of whether or not the noise is considered reasonable under the circumstances. This criterion is usually the same one that will determine whether or not a public law is being violated. Also, it is possible that the modelers might be successful in persuading the local authorities that their activities were not in violation of any law or ordinance and that a lawsuit instituted in behalf of the public against them was not warranted. In this event, the disturbed property owner could still sue the modelers in a private nuisance suit if he were willing to undergo the expense.

Noise as a Nuisance. Modelers have the legal right to pursue their hobby provided the noise does not create a nuisance, that is, unduly infringe on the right of another to enjoy his property. The law of nuisance centers around the fact that two property owners sometimes have conflicting rights. One has the right to use his property as he sees fit and his neighbor has the right to enjoy his property free from annoyance. Out of this conflict, one general rule has emerged: each person must put up with a certain amount of annoyance, inconvenience, and interference.

As applied to noise, this means that no one is entitled to absolute quiet in the enjoyment of his property. Reasonable noises in an appropriate locality are not necessarily nuisances, even though they may be disagreeable and annoying. From a review of decided court cases, the following five principles or factors emerge as the ones upon which courts base their decisions whether or not to grant an injunction, i.e., whether or not the noise has to be tolerated: (1) the degree of annoyance, (2) the nature of the locality, (3) the manner of operation of the noise-making facility, (4) the character (volume, time and duration) of the noise, and (5) a balance-of-interests test.

The Modeler's Case. It is believed that, in most cases, modelers would have a sound defense in an action for injunction based on nuisance. That modelers are in a favorable posture can be seen from an analysis of their position with respect to the five criteria set forth in the preceding section.

1. *Degree of Annoyance.* The degree of



Use of noise-abatement mufflers on model airplane engines has proved to be an aid in the obtaining and retention of flying fields — especially important when large engines are flown for long periods. AMA's General Counsel indicates that muffler use strengthens the modelers' case in the event of legal action. Photo from earlier tests of the AMA Muffler Committee.

harm caused by noise has a broad spectrum. At one end is actual physical injury or injury to one's health. Slightly less serious is material damage to the plaintiff's property. At the other end is minor discomfort or annoyance. The harm caused by the noise from model airplanes is of the annoyance type, the least serious and the easiest to justify. Annoyance is all that any plaintiff can be said to suffer.

If any more serious harm is alleged, it can be counteracted by showing that it must be due to the fact that plaintiff is a person of unusual sensibilities (which is no grounds for an injunction). This should not be too hard to do as the effect on a normal person of model airplane noise would, in fact, be only bother or annoyance. The latter can be a ground for injunction but it will depend on whether the other circumstances of the case make it reasonable that the annoyance should be tolerated.

Possible Supporting Arguments—It would always be advisable to check the opinion of other residents in the area (especially if they are modelers or friendly toward model airplane activities). Statements by other nearby residents that they were not disturbed by the noise or that the noise to them was only a slight annoyance would be very effective evidence to minimize any alleged degree of annoyance claimed by the plaintiff and at the same time to prove that the annoyance is, in fact, so trivial that an injunction should not be granted. It may also be possible to show that the annoyance can be minimized if the plaintiff closes his windows.

2. *Nature of Locality.* The strength or weakness of the modeler position on this factor will vary from locality to locality. However, at a very minimum, the noise made by a model airplane is no louder than the noise which comes from ordinary engine-driven lawnmowers, which are in common use in all residential areas.

Possible Supporting Arguments—The idea is to look for noises similar to that of a model airplane engine or other noise-creating activities in the area so that it can be argued that the noise complained of is not out of character with the standard of comfort (noise level) that prevails in the area, i.e., since other similar noises in the area are tolerated, it is not unreasonable for the noise of a model airplane to be tolerated. The following possible noise sources would tend to give the neighborhood a high level of noise:

- (1) The driving of motorbikes or small foreign cars through the neighborhood.
- (2) Electrical or engine-driven appliances which might be used outdoors (for example, there may be an amateur carpenter in the neighborhood who frequently uses power tools in his garage).

- (3) Any business or commercial enterprise of any nature. It doesn't have to be connected with a factory or workshop where loud noises emanate from machines. Added to the noises which arise from the running of a business itself are the noises which result from the influx of people other than residents (customers, employees, etc.) into the area. Large clusters of people (with consequent noise) may be attracted. If not, there is always the noise of the increased traffic.

- (4) The flying field itself could easily be a source of noisy activities at times when modelers aren't using it; perhaps it may be used for sports events, or bazaars and picnics (even constant use of the field by children playing would be a consideration adding to the total amount of noise).



Academy of Model Aeronautics

NATIONAL HEADQUARTERS

1239 VERNON AVENUE
Washington, D. C. 20005

August 29, 1969

Honorable Rosel H. Hyde, Chairman
Federal Communications Commission
Washington, D.C. 20554

Dear Mr. Hyde:

On May 11, 1966 the Commission, under your leadership, made available five frequencies in the 72-76 mc band for the radio control of model aircraft upon the condition that interference would not be caused to reception of television transmissions on Channels 4 and 5.

Three years later and despite the increasing use that has been made of the 72-76 mc band frequencies by aircraft modelers, there has not been, to our knowledge, a single complaint of interference to TV 4 or 5 reception, or to the use made by other radio services of these five frequencies. In other words, the very low power allowed and used for radio controlled model aircraft activities has permitted a most beneficial and needed allocation for the aircraft modeler fraternity, without prejudice to a single other radio user.

As you will recall, the A.M.A. filing in this FCC Docket proceeding pointed out, in summary, that "model aviation generates the spark of interest which can motivate an aerospace, an engineering or scientific career. It teaches the basics of flights. It teaches the basics of aerodynamics and telecommunications. If we are to prevail in the Space-Race and not contribute to national self-burial through over-concentration, in the frequency allocation area, in the revenue producing aspects of the radio art, these talents in our youth must be encouraged."

You have encouraged those talents in our youth to the full limits of your capacity as Chairman of the Federal Communications Commission, to the lasting benefit of our country. It is with pleasure, therefore, that I present you with the enclosed photograph of U.S.A.F. Colonel Frank Borman, Command Pilot of the Apollo VIII manned flight, shown receiving the A.M.A.'s distinguished service award as the first A.M.A. member around the moon.

Very truly yours,

John Worth
Executive Director

AMA enjoys a happy relationship with the Federal Communications Commission. The letter above, from AMA Executive Director John Worth to the chairman of the F.C.C., relates AMA's findings of the non-interference to other radio services by licensed flyers on the 72-76 mc band. The (Continued on right-hand page)

(5) Another possible argument could come from the zoning laws. The fact that your locality has a zoning classification in which certain noisy activities are permitted would tend to establish the character of the neighborhood as at least that noisy.

3. *The Manner of Operation of the Noise-Making Facility.* As the noise from the engine of a model airplane is obviously vital to the modeler's activities (without the engine, the plane couldn't fly), the only question is whether or not there is anything that could be done to the model plane to reduce or minimize the noise. The answer to this question lies in the technical feasibility of using noise mufflers.

The activities of the Academy of Model Aeronautics would be helpful to explain the present status of the muffler problem. The Academy of Model Aeronautics has done extensive research in this area with the idea of passing regulations for the mandatory use of mufflers or "silencers" in all the modeling competition which it sanctions (similar to the safety regulations which must be followed at all sanctioned events). In 1964, a muffler com-

mittee was appointed to study the technical aspects of noise abatement. And in 1965, an engine silencer testing program was launched. To date, no muffler regulations have been passed as a result of these programs (because a universally satisfactory muffler has not been available) and no specific muffler has been recommended by the AMA.

It would appear, however, that only in a very limited number of cases may it be argued that noise mufflers are not technically feasible. There are mufflers available which reduce the noise, or at least make the sound less annoying. Although these mufflers are not entirely satisfactory, wherever the quantum of noise is a critical factor in the noise complaint situation, their use should be attempted; or their future use should be offered as a means of alleviating the problem.

Supporting Argument—Due to the efforts of the AMA in conducting the muffler research and also prodding the engine manufacturers themselves to develop an effective muffler, modelers can assert that a great deal of time and effort is being continuously expended on their behalf in an effort to minimize the noise. This assertion carries little weight le-

FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON 25, D. C.

September 3, 1969

IN REPLY REFER TO:

Mr. John Worth, Executive Director
The Academy of Model Aeronautics, Inc.
1239 Vermont Avenue, N. W.
Washington, D. C. 20005

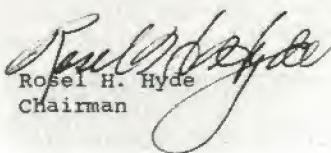
Dear Mr. Worth:

Thanks indeed for your report of the increasing use that is being made by aircraft modelers of their 72-76 MHz frequency allocation.

It is very gratifying to know that the utilization of this valuable portion of the radio spectrum has been increased in this way, without interference by the low power radio stations of the aircraft modelers to TV Channel 4 or 5 reception.

Your thoughtfulness in supplying us with the photograph of Colonel Frank Borman receiving A.M.A.'s distinguished service award is also appreciated. I have always felt that it is one of the primary obligations of our agency to encourage an interest in radio and scientific matters and am delighted the Commission's 72-76 MHz allocation is contributing to this objective.

Sincerely yours,


Rosel H. Hyde
Chairman

letter on the right hand page is the response, indicating the appreciation which the F.C.C. has for AMA activities. AMA is in regular contact with such governmental agencies as the F.C.C. The fact that AMA represents the entire aeromodeling public, in addition to its over 27,000 members, without commercial interest, promotes the favorable recognition extended by such agencies.

gally, but it would probably bolster the modelers' argument in out-of-court situations where modelers only have to persuade someone of the reasonableness of their activities.

4. *The Character of the Noise.* Considerations concerning the volume of the noise have been covered in the section on the nature of the locality. Since modeling generally requires daylight, interference with sleep should be no problem. The duration of the noise is one factor which probably will not be favorable to the modelers' case, as flying activities are likely to go on for a number of hours. The longer the duration of the noise, the weaker will be the modelers' position on this particular point. The best thing to do here is not to mention duration at all unless an issue is made out of it.

In the way of defense, the noise from engine-lawnmowers is usually continuous for a couple of hours (depending on how big the lawn is). If there are any businesses in the area, that noise probably goes on all day. And athletic contests or social events go on for a number of hours.

It should be remembered that duration

is just one small factor in the multitude of factors that determine whether or not a noise is reasonable. For example, if the noise is shown not to cause any annoyance, it wouldn't matter much how long it went on.

5. *The Balance of Interests Test.* The balancing of interests in the modelers' case should weigh heavily in their favor. The only benefit that would result if an injunction were granted is that the plaintiff would be relieved from the annoyance. There would be no benefit to the public.

The harm to the local model club or group of modelers that would result if an injunction were granted will vary depending on the availability and suitability of other flying fields in the area. The most effective way of showing the harm to the modelers is to give the distance in miles to the nearest flying field that is being actively used for modeling.

The benefit to the public that would result if an injunction were denied is determined by the social value and general utility of modeling. In the minds of uninformed persons, modeler activities may be equated with merely "playing with toy airplanes." This notion must be dispelled

if modelers are to gain favorable results under the law; and this "playing with toys" notion can be dispelled by briefly explaining modeling activities and by proving the social value and general utility of the modeling hobby.

Modelers do not buy their model airplanes like toys in a store. They build the models themselves, from a kit or from plans. Whether the design is simple or complicated, creative instincts are stimulated and youngsters learn to be mechanically-minded. Once built, modeling activities include many different types of sporting competition, which test the skill of the individual as well as the ability of the machine. Although modeling has proved value as a deterrent to juvenile delinquency, its greatest contribution to society is in stimulating the interests of youth in engineering and scientific matters.

The national shortage of engineering and scientific personnel is a problem that may be well known, but is too often taken lightly. An example of legal proof of the dimensions of the problem and of the contribution of modeling to the development and stimulation of scientific and technical interests was used in a presentation to the Federal Communications Commission; on the basis of which that agency allocated a group of frequencies for radio control of model aircraft. That this Federal agency charged with parcelling out the valuable and scarce radio spectrum granted specific recognition to modeling is, in itself, strong proof of this activity's great value to the public since the touch stone of all FCC frequency allocations under Section 303 of the Communications Act of 1934, as amended, is the public interest.

Follow AMA Rules

Fly Safely!

Indoor World Champ Team Finals

By Clarence Mather
Program Administrator

Soon three lucky modelers will be winging their way to Europe and the World Indoor Championships in the huge Romanian salt mine! That exciting trip and competition is the prize for the top three winners of the July 13 Team Selection Finals Contest held in hangar No. 5 at Lakehurst, New Jersey.

Indoor FAI is a great activity! The local trials and quarter-final steps are interesting and challenging contests in their own right. I encourage modelers to enter them even if they don't plan to go all out for the team. How about you — have fun and provide competition for the others. There will be the satisfaction of having contributed to the team effort. For those who want to continue in the program there is the chance of making the team and having the real thrill of representing the U.S. at the World Championships!

Indoor FAI models are small — 25.5 inches of wingspan — so are easily built, easily transported, and easily flown in small sites. They can be trimmed for high altitude flying in small sites by utilizing short motors and weighted sticks as developed (I believe) by the West Germans. By joining the National Indoor Model Airplane Society (contact Bud Tenny, Box 545, Richardson, Tex. 75080) one can receive the indoor journal and so keep up on the latest designs and techniques. With a rather small amount of

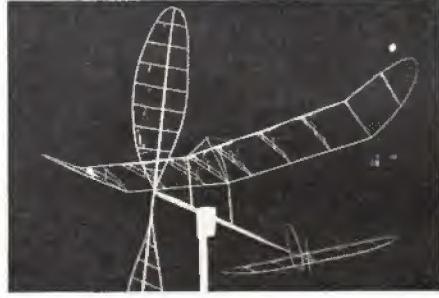
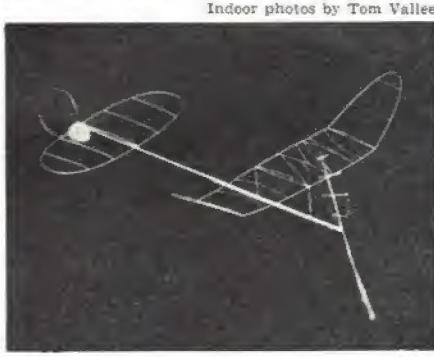
practice and experience one can build competitive models. I'll admit that to see the elliptical perfection of Dick Kowalski's or Stan Chilton's models can be discouraging to the inexperienced. But the models don't have to look that sleek to fly well!

At Lakehurst the three finalists from each of the four geographical areas of the U.S. and the 1968 Indoor Team gathered for the showdown. Winner was Jim Richmond, 1968 World Champion. In second place was Pete Andrews, the first person to do thirty minutes. My third place shows that everybody has a chance!

Some flyers questioned Lakehurst as the Team Finals site since it was not centrally located. As Program Chairman I selected Lakehurst because it was big—the Romanian salt mine where the World Championship will be held has about 200 feet of usable ceiling height. Also, many of the FAI indoor flyers attend the Nats and this enabled them to enter or observe both competitions on one trip and one vacation. In addition, a poll of the qualifiers brought more votes for Lakehurst than other sites.



Clarence Mather, left, was administrator of the AMA program to select the three-man U.S. team to compete in the 1970 Indoor World Championship to be held in an underground salt mine in Romania. Mather was automatically qualified for the Team Finals by virtue of being on the 1968 team; both he and James Richmond (1968 Indoor World Champ) put in good flights to regain team positions—joined by long-time indoor flyer Pete Andrews whose model is shown at right.



Model of Erwin Rodemsky, left, had huge propeller, many compression wing ribs, long 18" motor stick—one of the most original models at Team Finals. Model made a long flight of over 33 minutes and seemed to be on the way to another when it hung up on a wire at just over 13 minutes. Famous modeler at right is Joe Bilgri, named manager of the U.S. Indoor WC Team.



FAI INDOOR TEAM FINALS, LAKEHURST, N.J. JULY 13, 1969

	1st	2nd	3rd	4th	5th	6th	Total
1. James Richmond, Bensenville, Ill.	26:53	34:32	41:45	33:23	13:25	33:24	76:17
2. Pete Andrews, Scranton, Pa.	26:50		17:50	32:39	33:08	34:15	67:23
3. Clarence Mather, San Diego, Calif.	32:03	22:41	32:34	19:35	28:16	22:15	64:37
4. John Triolo, Whippany, N.J.	25:10	22:37	27:04	28:53	20:21	35:00	63:53
5. C. V. Russo, Clark, N.J.	31:01	31:30	28:46	7:41	32:06	16:05	63:36
6. Joe Bilgri, Santa Clara, Calif.	24:42	26:16	31:01	32:29	28:57	27:14	63:30
7. Erwin Rodemsky, Barrington, Ill.	5:26	28:46	25:37	24:44	33:31	13:25	62:17
8. Bud Romak, Moraga, Calif.	29:22	30:19	31:04	16:20	27:03	11:27	61:23
9. Al Rohrbaugh, Ft. Wayne, Ind.	15:14	25:09	29:04	25:13	32:08	28:59	61:12
10. Dick Kowalski, Warren, Mich.	:14	30:57	.27	11:06	28:59	.28	59:56
11. Robert Randolph, Loma Linda, Ca.	27:51	30:13	27:36	11:32	26:04		58:04
12. Bill Hulbert, Akron, Ohio	:27	26:29	22:34	24:09	26:47	28:37	55:24
13. Paul Tryon, Hazelwood, N.J.	17:27	19:14	21:36	9:33	13:54	23:30	45:06
14. Ralph Tenny, Richardson, Tex.	14:57	15:57	20:38	22:19		16:54	42:57
15. Stan Chilton, Wichita, Kans.	12:51						12:51

RC Frequency Flags

Do you have the proper frequency flag on your transmitter? You should because only in this way can other flyers know at a glance what frequencies are in use. If a pilot sees that his frequency is not being used, he knows that he can proceed to fly or test without causing a disaster to anyone else.

Standardization is of the utmost importance. The AMA Frequency Committee (Ed Lorenz, chairman, Walt Good, Howard McEntee, John Phelps and Paul Runge) several years ago considered the subject of RC flags for several months before arriving at recommended frequency flag colors. The correct usage of these flags is so important that the information is reprinted below—clip and save.

27 mc Flags.	Triangular
26.995 Brown	27.145 Yellow
27.045 Red	27.195 Green
27.095 Orange	27.255 Blue

50-54 mc Flags. In addition to standard frequency flag colors, the AMA Frequency Committee recommends five super-het spots and two super-regen instead of random selection of frequencies in this band. The recommended spots were carefully selected to prevent image troubles, problems with oscillator harmonics and other difficulties (use of 53.0 mc and 52.0 mc, for instance, could cause trouble to flyers on the 53.1 to 53.5 spots).

Super-Het spots and flags:
53.10 Black/Brown
53.20 Black/Red
53.30 Black/Orange
53.40 Black/Yellow
53.50 Black/Green

Super-Regen spots and flags:
51.20 Black/Blue (light)

52.04 Black/Violet

72-76 mc Flags. Here, a white ribbon (approx. 1" x 16") indicates the 72 band, and a colored ribbon (approx. 1" x 16") indicates the exact frequency. Thus a transmitter antenna for 72-76 mc will show two flags, one white and one colored, as follows.

72.08 White Ribbon and Brown Ribbon
72.24 White Ribbon and Red Ribbon
72.40 White Ribbon and Orange Ribbon
72.96 White Ribbon and Yellow Ribbon
75.64 White Ribbon and Green Ribbon

DD's at EAA Convention

The building of model airplanes is a natural stepping stone in developing both the interest and skills necessary for producing a homebuilt aircraft. That's one reason why many AMA members also belong to the Experimental Aircraft Association, an organization dedicated to the advancement of aviation education, homebuilt aircraft and private aviation.

With these interests it was natural for the EAA to include a Delta Dart Program during its 17th Annual International Convention earlier this year at Rockford, Ill. For the story on full-scale activities, see page 16 of this issue.

The EAA Delta Dart Program was conducted by John W. Grega of Bedford, Ohio, a member of both AMA (Contest Director) and EAA (Model Program Chairman). Approximately 450 EAA versions of the AMA Cub rubber-powered model were distributed free of charge—a goodly number considering the rainy day they had. Models were built at the field in a tent big enough for nearly a hundred youngsters. Flying had to be postponed until the next day—which saw good weather—because the damp air had slowed the drying of the glue.

Fifty-two youngsters made official con-

test flights. Most who built the Cub models were members of EAA families from across the nation who attended the convention.

Winners in the Fledgling (10-11) class were 1. John Voth, St. Cloud, Minn.; 2. Sue Edelstein, Jersey Shores, Pa.; 3. Bill Edelstein, Jersey Shores, Pa. Junior (12-15): 1. Bryan Pender, Grand Blanc, Mich.; 2. Robert Edelstein, Jersey Shores, Pa.; 3. Darryl Deets, St. Petersburg, Fla. Senior (16-20): 1. Dick Ketchum, Dodgeville, Wis.; 2. Dan Blake, Hialeah, Fla.; 3. Pat Moore, Mel River, Mass.

Grega expects the EAA's model program next year to be expanded. He reports that the association was very pleased with the results shown this year.

HQ note: Information on obtaining AMA Cub model kits in quantity at low cost may be had by writing AMA HQ, 1239 Vermont Ave., N. W., Washington, D. C. 20005.



Holding his completed EAA version of the AMA Cub model is Dick Stouffer, Jr., son of Official EAA Photographer Dick Stouffer who took these photos. Special wing imprints available at no extra charge with 1,000 kits.



John Grega, AMA Contest Director for the Experimental Aircraft Assn. Delta Dart Program, gives building instruction to some of the many youngsters who joined in the fun during the 1969 EAA Convention at Rockford, Ill. Mass fly-off of models below.



Executive Council '69 Nats Meeting

Those present at the start of meeting No. 1, July 14, were: **John E. Patton**, president; **John Worth**, executive director; **Earl F. Witt**, secretary-treasurer; the following district vice-presidents: **Cliff Piper**, I; **Eva Biddle**, III; **Cliff Telford**, IV; **Gosta Johnson**, VI; **Jack Josaitis**, VII; **W. J. Lank**, VIII.

8:15 PM. Meeting started with **John Clemens** showing his recently produced movie of the AMA HQ operation, taken during his visit to D.C. in March. Following the movie John Patton asked Clemens to report on his PR activities during the four months since he started working part-time for the Academy.

Clemens described the amount of correspondence he has been involved in, told of various specific projects he worked on, including several to do with the Navy and NASA on behalf of AMA. He then answered questions from council members and discussed recommendations for future movie projects, then left the meeting.

Patton next introduced **Maurice Woods**, who had been previously appointed as a special presidential assistant for RC. Woods described the recommendations of a committee he had formed to investigate what might be done to improve representation for RC flyers within AMA. He emphasized that the proposal described in his committee's printed report, made by **Jim Kirkland**, was supported by his entire committee. The proposal basically is to provide a separate council for RC within the Academy.

Woods indicated that he did not believe it possible for the present council structure to handle all of the general problems of AMA, plus the special problems of RC. He gave as an example the problems of Contest

Board operation where even the present RC Contest Board arrangement needs dividing into special interest representation. He suggested also that, to be most effective, an RC council should have its own authority and jurisdiction so that the RC people could, with a relatively free hand, solve their own problems without compromise to other interests.

Art Schroeder (District II V.P.) arrived at 9:15 during discussion of Woods' recommendations. Woods continued, citing some examples of past RC problems which he felt could have been better handled by an RC-only group. Various council members asked questions and made comments concerning details of the committee recommendations. Discussion continued extensively for about 45 minutes. **Stan Chilton** (District IX V.P.) arrived at 9:55 PM near the end of the general discussion. Patton called for a final round of questions, then terminated the subject at 10:10. He thanked Woods for his excellent presentation and council members shook hands with Woods at his departure.

The council then resumed discussion concerning the Woods' committee proposal. Various means of achieving the committee's desires were discussed. Patton then suggested that the subject be tabled so that everyone could reflect on the evening's discussion with a view toward resumption of discussions at the next meeting.

Patton then asked for discussion concerning continuance of the current AMA PR contract. Worth read a letter from **Ernie Green** with a proposal to work at HQ as a full time staff member with part time PR duties. Worth also reported that **Bob Lopshire**

had offered to work part time for AMA in a PR capacity. Council members then discussed AMA's PR problems and how to best improve PR services within budgetary limits.

Witt made a motion that the council not consider at this time adding a full time staff member with part time PR duties. Seconded by Gosta Johnson. Approved unanimously. Patton said he would write a letter to Green explaining the council decision. Patton also said he would ask Bob Lopshire to submit a more specific proposal for council consideration. Lank made a motion to extend John Clemens PR contract on the same basis as before, through December 31, 1969. Seconded by Witt. Approved unanimously.

Patton asked whether any of the agenda items needed attention before the next meeting. The executive director requested that his contract be adjusted to include a cost-of-living increase; noting that the last salary adjustment was made two years ago. The council tabled action until the next meeting.

Art Schroeder advised the council that due to new commitments it would be necessary for him to resign. He suggested and recommended that his runnerup in the previous election, **Bill Boss**, be appointed by the council as his replacement. Piper made a motion that Schroeder's resignation be accepted, effective at the termination of the 1969 Nationals. Seconded by Eva Biddle. Approved unanimously. Telford moved that Bill Boss be appointed as the new District II V.P. to complete the duration of the term. Seconded by Lank. Approved unanimously. Meeting ended at 11:20 PM.

Those present at second Nats council meeting, July 15, were the same as before, plus **Bill Boss** and **Pete Peters**.

9:25 PM. Meeting started with President Patton introducing Bill Boss (District II) to the council. Patton also noted that Pete Peters (District VIII) was in attendance as an alternate for Bill Lank who was expecting to have to leave for home before the meeting ended.

Worth then distributed copies of the minutes of the previous meeting. The council studied them and when asked for approval by Patton, no objections were posed to their acceptance.

Patton then asked for council followup concerning the executive director's salary. Worth and Peters adjourned and the council heard an extensive review of Academy financial matters provided by the secretary-treasurer. After considerable discussion, the council reopened action on a motion which had been previously tabled.

The Council voted to increase the executive director's salary, effective August 1. The increase included a cost-of-living plus merit adjustment, and Patton commented that the executive director's performance had been excellent. Worth and Peters rejoined the meeting and some additional discussion of financial matters was held, including a brief review of various HQ salary relationships. It was recommended that they be improved. Worth said he would try to negotiate suitable changes to achieve a more consistent graduation of pay scales.

Patton asked the council to next consider the previously published agenda item which concerned the question of free membership criteria for Contest Directors. Much discussion followed concerning various modifications of the current criteria and a specific proposal by Bud Tenny of Dallas. Bill Lank left the meeting at 11:30 and Peters took his place. After extensive deliberation which revealed difficulties in administering all of the proposed plans, Earl Witt made a motion to continue with the present system and review it again at the winter council meeting. Seconded by Chilton. Witt further commented that the complexities and expense

of expanding the current system were not presently justified. The motion was unanimously approved. Witt further suggested that for simplification, the system be administered by credit vouchers for Contest Directors who qualify. The suggestion was well received by the council and generally recommended.

Patton next asked for suggestions as how to best serve AMA members in areas beyond the basic continental boundaries of the U. S.: Hawaii, Alaska, and others overseas. It was proposed by Witt that one Associate Vice President for Hawaii be appointed by the District X Vice President, and one Associate Vice President for Alaska be appointed by the District XI Vice President. He also proposed that all others be represented according to home towns, with a place on the annual election ballot for overseas members other than Hawaii or Alaska members to indicate their home district. The proposal was unanimously approved.

Patton then introduced the subject of flying site loss problems related to noise, suggesting that the council recommend the

use of mufflers where such problems exist. Witt made a motion to adopt Patton's wording as a policy statement. Seconded by Josaitis. Approved by all except Chilton, who abstained.

A brief review of Headquarters services for organizations or businesses outside AMA was next discussed, as a followup to the earlier financial discussions. It was noted by the secretary-treasurer that substantial income was possible from such business but that current rates for services performed for NAR and AAM should be adjusted upward. The executive director agreed that current rates were in need of renegotiation and should be increased by the end of the year.

Patton asked for reconsideration of the proposal by M. Woods' committee. Telford stated that he felt that the council should take some action to help solve the problem of RC dissidents within the Academy, but he agreed with a statement by Witt that the committee's proposal was unworkable. Considerable discussion followed on both of these points. It was generally agreed that the present structure of AMA could accomplish the committee's purposes, but

that the mood of those seeking change would not be satisfied with minor accommodations. Worth suggested that a Contest Board type group with greater authority beyond mere rules-making be formed, perhaps to be known as a Competition Council.

Witt made a motion that the council initiate a study toward the expansion of the responsibility and authority of Contest Boards, including contest procedures. Seconded by Schroeder. Unanimously approved.

Schroeder then moved that the president write a letter to Maurice Woods stating that the council recognizes and commends the effort of the Presidential Committee and has decided to try to accomplish the same result as proposed by the committee, through a study as proposed by Witt. Seconded by Worth. Unanimously approved.

Patton, noting that there was no further new discussion on the subject, asked for any other business to be brought up. Witt asked that the question of a West Coast office be considered. Worth reported on a study just completed of Headquarters operations, which indicated that considerable duplication of effort would result due to magazine mailing requirements and the need for financial monitoring. It was also noted that because of the problems, costs could be expected to be higher—that no savings were likely to offset the increased total effort. Council discussion indicated that the public relations benefits alone would not justify the setting up of a West Coast office, particularly if the services available from that office were to be limited, as provided in the original proposal.

Worth then suggested that another approach might be more appropriate. He noted that the Academy used to have an AMA Dealer License Station program, which had been discontinued several years ago. He suggested that a revised and expanded license station program would be developed and that he expected it could be ready in time for 1970 memberships. A significant feature of such a program would be its suitability to all areas of the country, including its use by chartered clubs. If properly developed, the program could offer improved membership servicing in all parts of the country.

Witt made a motion that further consideration of adding a West Coast office be discontinued. Seconded by Telford. Unanimously approved. Worth said he would proceed to develop further the new dealer license station concept.

Piper made a motion to adjourn, seconded by Costa Johnson; unanimously approved. Meeting ended at approximately 1:30 AM.

Editor's note: Since the council meetings President Patton has been exploring several later proposals for improvement of RC representation within AMA. He has indicated that a specific new proposal, combining many of the ideas presented to date, would be offered for council consideration at the mid-winter meeting in February or March.

CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

Dec. 6-7 — Taft, Calif. (AA) Thermal Thumpers Annual FF Contest. Site: Gardner Field, G. Wallock CD, 220 LeRoy Ave., Arcadia, Calif. 91006. Sponsor: Thermal Thumpers.

Dec. 14 — Van Nuys, Calif. (A) N.A.R. Flightmasters 1st Annual Rubber Scale FF Contest. Site: Sepulveda Basin, C. Hatrak CD, 3825 W. 143 St. Hawthorne, Calif. 90250. Sponsor: NAR Flightmasters.

Dec. 28 — Fresno, Calif. (A) Fresno Monthly FF Meet. Site: Near Kerman, F. Gallo CD, 1725 Kenmore Dr. W., Fresno, Calif. 93703. Sponsor: Fresno Gas Model Club.

Jan. 2-4 — Sebring, Fla. (AAA) 16th King Orange FF & CL International Meet. Site: Sebring Air Terminal, S. Slater CD, 42 Magnolia, Sebring, Fla. 33014.



Wally Hudson photo

Finalists in the 1969 RCIA Masters Invitational Tournament were, above from left, George Hill, Annandale, Va. (modified Citron, Kraft, Veco 61); Jim Kirkland, Valparaiso, Fla. (Citron Mk II, Pro Line, Lee Custom); Phil Kraft, Oceanside, Calif. (Kwik-Fli, Kraft, Enya); Tony Bonetti, Emerson, N. J. (Troublemaker, Kraft, Webra); Ed Keck, Webster, N.Y. (Starfire, Pro Line, Lee 61); Jim Whitley, Decatur, Ala. (Daddy Rabbit, Pro Line, Supertigre); Ron Chidgey, Pensacola, Fla. (Citron TW, Pro Line, Lee 61). Finals place positions were taken by Chidgey, 1st, 726 points; Bonetti, 2nd, 677; Kraft, 3rd, 674; Kirkland, 4th, 654; Keck, 5th, 590. Seventeen of the nation's top RC Pattern flyers took part in the September 13-14 event at Marietta, Ga., under sponsorship of the Radio Control Industry Association — held in conjunction with the Southern RC Trade Show at Atlanta. One of the open events flown during the invitation-only Masters was RC Limbo — Harold Coleson shown in photo below flying his model under the barrier. The AMA Chartered Cobb County RC Club was host to the contests; Len Purdy, Contest Director.

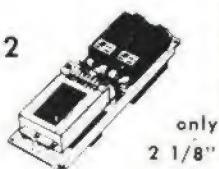
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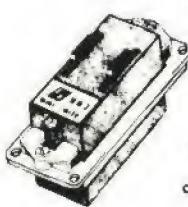
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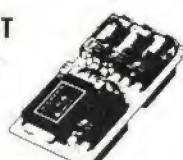
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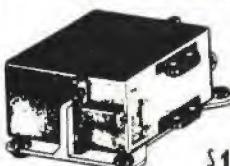
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Coff 35—Alan Schennerman's Class L winner. A delta flyer on a throat-fried-down JS. It lets the novice shoot touch-and-go all day. Fly it full bore for aerobatic fun. [pic of the above is enclosed too]

Sunliner 365—Harry Murphy designed this FF with plenty of wing area to tame the hot .049 and .051 engns. He built it light yet strong for high performance.

Papa Toco IX—Highly efficient design by Walt Perkins. Retractable landing gear cuts down on the frontal area; adds speed and laps. Lightweight too for acceleration.

Group Plan # 1267 6 oz. \$1.50

Neutrino—not an ordinary delta, this RC was engineered by Dave Youngblood. Fantastically stable and strange appearing, it matches a regular multi ship's performance. Power it with a .45.

Band Wagon—for the flyer about to try Wakefield FF. Brian Dunn set out to design a simple yet sturdy model. It's easy to adjust too. Best of all the prop assembly need not give you nightmares.

Group Plan = 168 8 oz. \$1.50

Holberspdt-B-11—Semi scale control liner of a famous WWI fighter by Walt Musciano. Power this rugged model with a .15 to .23 and take off on the dawn patrol.

Dee-Bee—Dario Brisighella's newest RC. Scale like multi design was patterned after the classic national air racers of the thirties. Fly this original with a .60.

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Skyvan

Continued from page 38A

hole to permit some movement under heavy landing.

The center section of the wire has a "U" shape for retention, which is accomplished with a washer and 3-48 screw and nut, which goes through the $\frac{1}{2}$ " sheet.

Wing: The wing is simple, also having a straight chord. Ribs are cut from $\frac{1}{16}$ " balsa sheet except four, which are cut from $\frac{1}{8}$ " sheet and are used in the nacelle area. Please note that we have a $\frac{1}{4} \times \frac{1}{4}$ " balsa reinforcement spar, which runs from the extreme edge of one nacelle to the external edge of the other. This provides more strength where it really is necessary.

You have to cut out the $\frac{1}{8}$ " ribs for this spar, and also the $\frac{1}{16}$ " thick ribs that fit into the wing in the center area between the nacelles. The leading edge is hard $\frac{1}{4} \times \frac{1}{4}$ " balsa wood and the trailing edge is $\frac{1}{4} \times 1"$ tapered stock. You'll have to sand in more taper, so the $\frac{1}{16}$ " balsa sheet covering the top of the wing lies in a smooth contour through the rib profile. Wing tips are made from $\frac{1}{2}$ " sheet balsa. On the control-line leadout wing panel, you have to provide a leadout guide made of $\frac{1}{16}$ " thick plywood, which is assembled into the wing tip that is notched for the plywood on the surface, which butts against the end rib. Make the inboard wing first, then the outboard panel after you sketch a quick duplicate of the plan. Cement together at the proper dihedral. For weight, I pushed four $2\frac{1}{2}$ " finishing nails into the outboard wing panel wing tip. Locate $1\frac{1}{4}$ " from leading edge.

In the nacelle area use $\frac{1}{8}$ " sheet balsa filler pieces as noted to provide a good cementing platform for the nacelle. Where the wing strut meets the wing, place a $\frac{1}{2} \times \frac{1}{2}$ " balsa block $1\frac{1}{4}$ " long — well cemented to the rib and $\frac{1}{16}$ " top sheet balsa, flush with the bottom of the wing. This provides a secure cementing connection for the strut, which is $3/16 \times 13/16$ " balsa strip.

Nacelles: The nacelles are cut from balsa blocks and sanded to shape. The motor mounting plate is $\frac{1}{8}$ " plywood. Thoroughly cement this area. Insure that the motor mount is parallel and perpendicular to the fuselage. Note nacelles are shaped to take into account the wing incidence and still be parallel to direction of travel with zero incidence.

Assembly: After the fuselage is assembled, cement into place the rudder and stabilizer assembly. Next, cement into place the main landing gear and then the front one as detailed earlier.

Note on the top view of the plans, in order to show bellcrank and internal assembly, that we left off wing and the bulbous section over the wing. After the wing is cemented securely into position (after bellcrank assembly and pushrod are connected to stabilizer), we can build up the bulbous section over the wing.

Cut the curved side panels from $\frac{1}{8}$ " balsa sheet, cement over wing as illustrated lining up with edge of fuselage. Cement inside $\frac{1}{8} \times \frac{1}{8}$ " balsa strips — $\frac{1}{8}$ " down from edge. This provides ledge again for horizontal panels, and also material when corners are rounded. The nacelles can be cemented securely to wing now. Radius all corners as noted on plans and then sandpaper entire model with 300 grit paper.

Apply two coats of clear dope, sanding with 300 grit sandpaper between coats. Then apply the model with two coats of sanding sealer, sanding each coat with 300 grit sandpaper again. I decorated model as follows, (however, your choice is as good as mine):

The entire model was painted white; rudder, stabilizer, and wing leading edges were painted black to simulate deicing boot.

Rudder and wing tips were painted blue as well as the decorative stripes on the fuselage. Windows were added in silver paint. Antenna elements, venturi tubes, wing lights, etc., were made of scrap balsa and added before painting, and then finished along with the model.

Flying: The plane is powered by two Cox Golden Bee 049 engines. Any other 049 engine will be acceptable. The Golden Bee has quite a bit of reserve power and, although the plane weighs over $1\frac{1}{2}$ lbs., it flies quite well on one engine. Unless you like to see the plane coming at your head while you hold the control handle in the center of the circle, when flying one engine, always make sure it is inboard one.

When flying on two engines, always start the outer one first to insure its stopping first so that you always have control. Make the solo flight on a calm day in order first to familiarize yourself with its characteristics. Flying was done on 35 ft. stranded wire lines. New dacron line would be acceptable. On two-engine flying, the centrifugal force is considerable, so the stronger wire lines would be preferred.

This plane is a winner, you'll enjoy it!

Scale at Bremen

Continued from page 24

Walter Reger did not get off the runway with the Yak 18PM before running into the grass. The Yak main gear is quite far back and requires considerable stick pressure to get it to rotate, and then must be relaxed to prevent too abrupt a lift-off. The flat VFW runway seemed to accentuate the problem. On the second attempt, he got off cleanly for a good flight.

Rune Swenningsson next returned a score of 2,097 with his P-51, but he was hampered in the final scoring by a low scale factor, which can all but obliterate a good flight marking.

With his excellent record of pattern and pylon competition flying behind him, it was to be expected that Joe Bridi would do well, and even under the windy conditions, he put the Nieuport through a fine schedule that brought him 2,081 points.

Roy Yates, who had won the Challenge de Graouilly International Scale meet at Metz, France the previous month, placed second at the British Nationals in May and with the superior scale factor already on the board of 0.922, was the center of attention as he taxied out and was off for the third best flight of the meet with his Percival Proctor.

The second round of flights and some of the second attempts were scheduled during judges' breaks after the pattern event started on Friday. Some of the high spots included Herbert Reger's 2562 second score and a 2380 by Alfred Laline with his Fokker D-7, which turned out to be the highest flight score made with a biplane. Bruno Klupp got his Fokker up, had trouble and a rough landing that bent his gear. Yates' second did not go as well as his first, particularly on landing, when he nearly hit the scorer's tent and then gave a burst of power that got it over onto the runway, where it hit on the nose and damaged the wheel pants.

Maxey's second outing with the Zlin appeared better than his first, but the judges didn't agree. Joe Bridi again put his Nieuport 11 through realistic maneuvers to raise his score by 64.5. The crowd realized that flying an airplane of this type was not easy. It is an unfortunate fact that a low wing monoplane is hard to top in the varying weather and field conditions encountered at contests.

My last flight did not materialize. The motor was reluctant to start. When our start-

Continued on page 55



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The basic rules allow the man to fly any type of aircraft with any engine up to a .60. Streamers are not required. The Gooney bird is allowed to take off, swoop, dive and land in any manner that will assure a near heart attack for its opponents. As in any other competition there are basic maneuvers or tactics:

Maneuver number one: The Gooney bird walks out in a circle and sits on control lines.

Defense: Helper releases model to chase Gooney bird off lines. Model performs horizontal figure-eights on the ground, striking helper in leg and requiring three stitches for cut. Model is brought under control, but not until control lines are wound through and around the propeller and chopped into tiny pieces.

Maneuver number two: Gooney bird stands off to one side of flying circle ahead of the takeoff point and times his takeoff so that he can fly directly across the flying circle at such a height that he snags the down control line as the model becomes airborne. This must be done before the model reaches a height of four feet, but less than two feet.

Defense: Better known as the ground-loop. One hundred points to the Gooney bird if he catches the plane the modeler has never flown before and has spent eight months building and finishing.

Maneuver number three: Gooney bird flies into middle of control lines at about 45 mph accomplishing the following: breaks

one or both control-lines, pulls bellerank out of wing of plane, and/or dislocates the hapless modeler's wrist, or flips the model into a 90-degree left turn inverted, and has the plane pass directly over the center of the flying circle as the modeler departs for distant areas.

Defense: Modeler goes into either an inside or outside loop followed by at least half a lap of inverted flight. One hundred points to the Gooney if modeler has never flown inverted before.

Maneuver number four: This requires from six to 20 Gooney birds. The object is to converge in the flying circle from all points at different altitudes, timed so that no less than two Gooneys are crossing the circle at the same time.

Defense: Can't be put into words but a helper who is proficient at unwrapping control lines from around the pilot, and who is quick with the tranquilizers, is a must. One hundred points to the Gooney bird if the crankshaft is broken.

One hundred points also is awarded to the Gooney bird that flies over and performs a disagreeable deed on the model as it is sitting on the flight line warming up. Bonus if he hits the helper, too. Should this occur, the helper will release the model to speculate loudly about the Gooney's probable ancestry, and allowing the model to jump forward, chewing the buttons off the pilot's shirt.

Additional points are awarded as follows: each model damaged, but repairable, 50 points; each model completely wiped out, 150 points.

Should the modeler be so fortunate, or unfortunate, as to knock a Gooney out of the air, he is awarded a \$50 fine for molesting a Gooney bird. Midway Island is a bird sanctuary!

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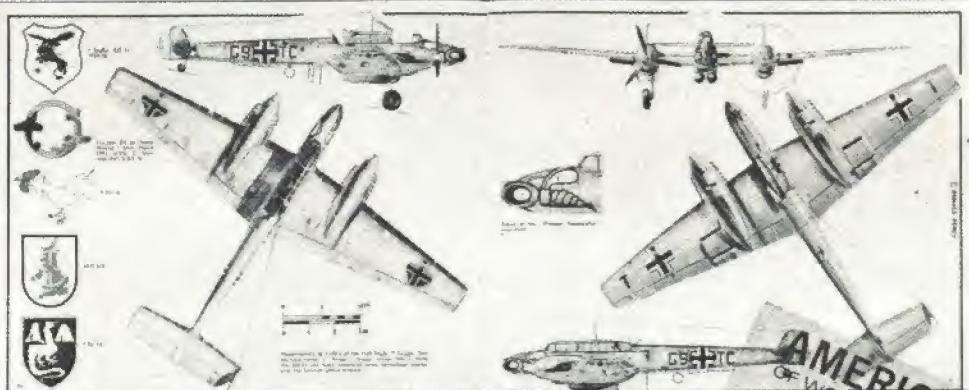
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A typical example of the quality of the contents of the Men and Machines Books is this illustration taken from the Messerschmitt 110 Fighter chapter of "German Fighters of World War II, Volume I." The cover illustration is for "American Fighters of World War II, Volume I."



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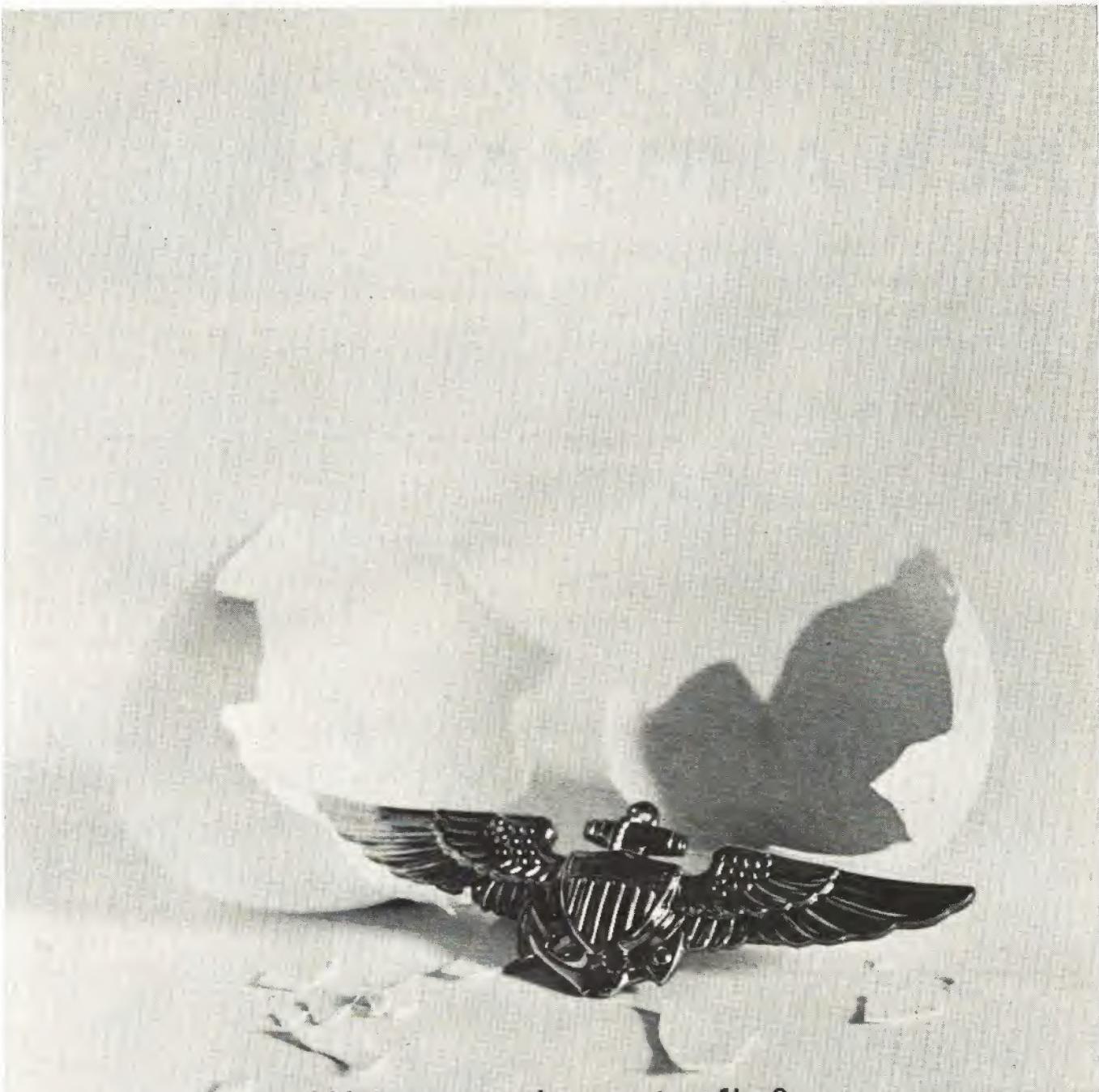
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Continued from page 50

ing time was up, we were asked if we wished to make our second attempt right then. Not used to second attempts, it almost seemed like a gift, and we said yes. Before you can say three minutes, I was all washed up, and realized a serious tactical error had been made. I should have checked for trouble and taken the second attempt later. One of the glow plugs on the twin had burned out.

Here is where a separate team manager, apart from the starting pressure on the runway, would have been valuable. The organizers had not permitted separate scale team managers, probably because the increase in size of the World Championships threatened to overwhelm available facilities. For future teams, it might be best to have several bull sessions about what to do in possible situations ahead of time.

Roy Yates won by an impressive margin and it must have been an especially pleasing victory since he missed first place in the British Nationals by a mere $2\frac{1}{2}$ points! The British team victory was a clear one. The rest of us have some catching up to do to reach their standards of scale detail excellence.

As always, there was hot and heavy argument about scoring incidents, inherent irregularities which will always be with us. There seems to be a feeling that kit-built models should not be accorded as many points as originals. During the meeting of the Scale Sub-Committee on the 26th, a rule was approved for submission to the November meeting of the CIAM that the competitor must furnish a list of the parts of the model he has purchased. A recommendation will appear in the judges' guide that competitors should not get points for craftsmanship on things they did not build themselves, and that kit models will be downgraded.

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Overly polished finishes, such as Maxey's, do not seem popular. In fact, most European models have dull finishes and use products like polyurethane enamel. Many overseas modelers hardly seem to know what butyrate dope is.

The judges were critical of non-scale speeds and other unrealistic flight regimes such as too briskly executed aerobatics. This will be an important item to watch in the future, since another recommendation to the CIAM will be to raise the difficulty factor for flight realism to K-30.

The scoring favored aerobatic models and penalizes other types. No modeler in his right mind is going to select a touch-and-go at a K of 8 when he can get K-10 for an Immelman, unless he is forced to by having a non-aerobatic type. Even at the same difficulty factor, the aerobatics are the easiest, since a touch-and-go carries the possibility of aborting the flight.

Many thought it a mistake to use the same judges for flying that did the scale marking, and that not only should two separate sets of judges be used, but their scores should not be released until both flight and scale judging had been completed. This is to prevent any unconscious feedback between what are two entirely separate considerations.

Monday found us heading back to Frankfurt. We spent the evening with Bruno and Walter. Next morning, Joe left for a tour of Italy. Bob Elliott was to depart for London. He presented some well-deserved gifts to Bruno and Walter — Logictrol Pro series outfit.

Tuesday morning, Maxey and I were delivered to Lufthansa Airlines by Bruno and Walter, and soon we were back in the U. S. A.

The World Championships are more than just a big contest. One feels the atmosphere that makes the Olympics so unique.

Control-line Highlights

Continued from page 31

Taylor, Mich., and Mike Thompson, Modesto, Calif. Dennis emerged the winner when Mike omitted the triangles from his pattern, thereby losing pattern points. Someone was overheard saying "Triangles would be painted on Mike's sun glasses so he won't forget them again."

In all classes of stunt, Fox 35 engines stood out. Most Juniors and Seniors flew foam-core wings. Most Open flyers used fully constructed airfoils. Most planes sported good finishes and fine workmanship. The appearance point category was topped by Dave Gierke, Amherst, N. Y. with 38 points out of a possible 40 for his Novi Four entry.

Navy carrier: With three decks running full blast, the carrier boys really turned in the flights. I don't think there was any contestant that didn't get his full number of attempts at official flights, but he had to hustle to do it. This was because of the way Carrier event operations were set up.

As I saw it, the processing (line-diameter check and pull-test) of planes at the circles left something to be desired. The tabulation of scores was done at one end of the field, pull-testing at the other end, with the three circles between. A Navy man was riding a bicycle all day delivering processed flight-score cards.

Did you ever see two guys carrying an imaginary piece of glass? That's what the contestants looked like while walking a plane from the pull-test area to a flight circle. Sometimes the walk was three circles long if you happened to get assigned to circle No. 3 and, after a bad attempt, walked all the way back for another pull-test.

Many of the old standbys were flown — Guardians and Maulers were in evidence at all the circles. There was a big showing of the Martin MO-1 by Don Gerber that was featured in the Aug. '69 issue of AAM.

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Speaking of the Martin MO-1, I was intrigued by the control system used by Gerber. It consisted of only two lines. Dropping the hook and controlling the speed was linked to the up and down movement of the elevator. As I understand it, the hook and speed control is locked in place for the high-speed run. After the high-speed run is finished, down-elevator releases the hook and actuates the speed control to a preset low.

If additional speed is required during the low-speed run, up-elevator blips the control for a burst of engine speed. The system was very effective on the flights I watched. Don didn't do too well in the Carrier Event, but his son John took first place in both 40 and 60 (Jr. Class), flying the Martin MO-1 equipped with a standard Roberts system.

Another effective system was the two-line electrical system by Frank Mitchell, Westfield, Mass. He employs an R/C Servo for actuating the speed control. Most all other contestants used the standard Roberts system.

Most widely used engines were the Rossi 60, and K&B 40 RR. K&B speed fuel was in evidence at all the carrier circles.

Your reporter also entered the 40 Carrier event with a full-scale P-51 Mustang made from the Jetco Kit. It weighed in at 34 oz. and is a very stable flyer. It is equipped with a removable hook so that it can be flown for sport flying.

Profile Carrier for the youngsters went over big. It was gratifying to see how well they handled their ships. I watched some of the junior flights where the flyer couldn't have been more than ten to 11 years old. They handled the planes like pros.

The near 90-degree temperatures and heavy humidity took their toll on most flights, with the engines quitting while attempting to get into low speed. Contestants frantically switched plugs and fuel, but to no avail. Perhaps this is why no records were set.

Control-line scale: This event was a disappointment from the standpoint of the number of entries. A total of 41 planes had been registered, but only 31 appeared at the scale cage at the entry deadline on Wednesday. The planes were of a fairly high quality, had many operational features.

Some of the features seen were revolving turrets, lights, retracting landing gear, bomb-bay door operation, firing cannons, operating flaps, shock-absorbing landing gear, throttle control, working microphones, rudder operation from rudder pedals, and control stick that operated all control surfaces of the plane while on static display.

One of the better aspects of the event is that just about all the planes entered put in their qualifying flights. This is quite an achievement in control-line scale. Usually, a number of contestants either have trouble starting their engines, or have underpowered ships.

Open competition saw Linton Kieth of Calif. walk off with first place with his four-engine Lancaster Bomber for the third year in a row. Kieth also took the newly offered \$100 annual prize by Sterling. Andrew Sheber, who placed third in the Open competition, also took the Testors Best Finish Award.

One of the most exciting models seen was Jim Romano's (Richmond Hill, N. Y.) A-26 bomber that took first place in the Senior Class. It weighed in at 14 lbs., and featured shock-absorbing landing gear, revolving turret, throttle control and a well detailed cockpit.

In the Junior Class Elliott Dixon III, Clifton, N. J., took first place for the third time with his good flying PT-19.

All in all, a swell meet with lots of interesting things to see.

Interesting highlights from the control-line event will be found on page 59 as seen by Control-line CD John Smith.

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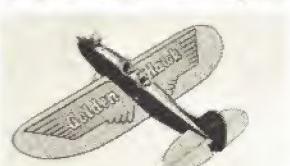
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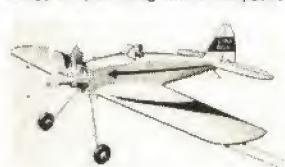
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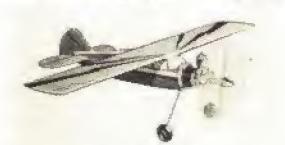
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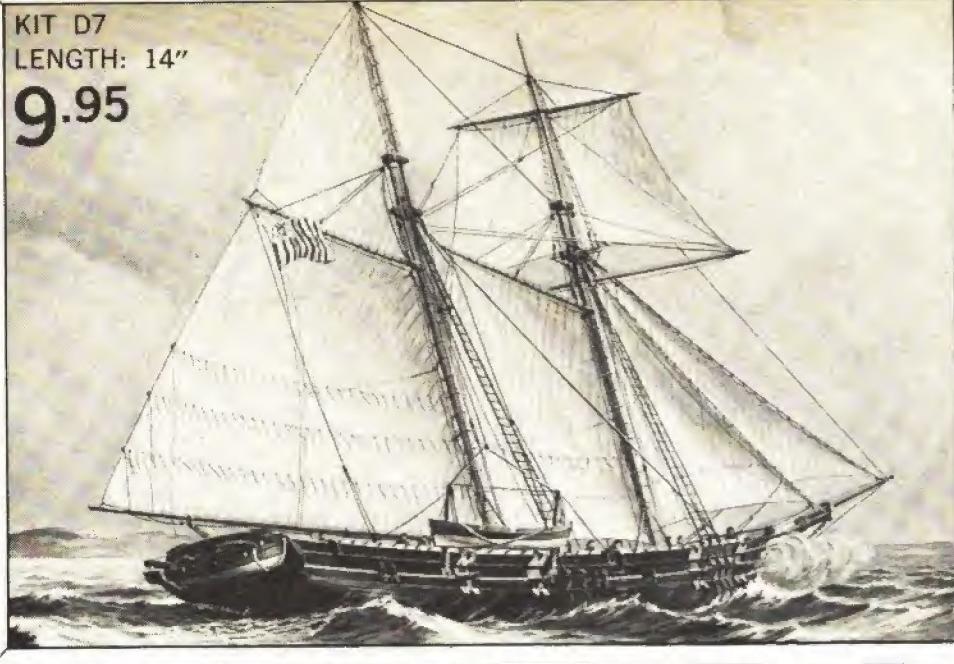
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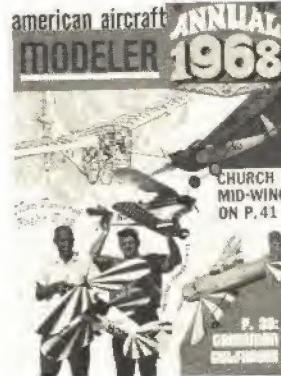
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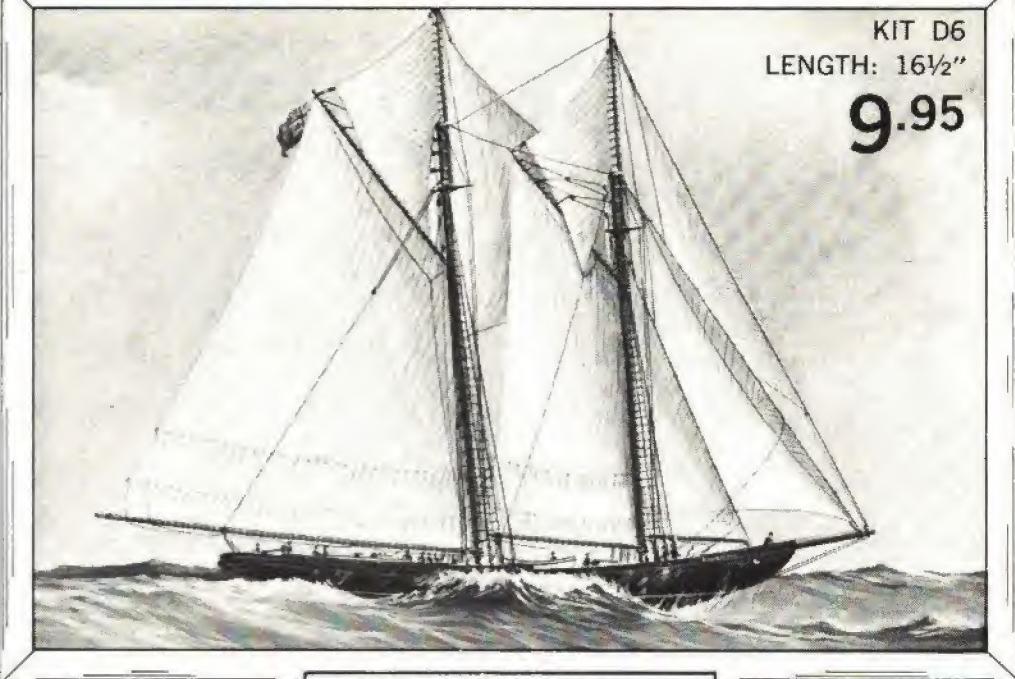
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From the C. D.'s Perch

This started Monday: Supertigre 65's are oversize. You sure? Yea, we checked and we're gonna protest them. What are you gonna do? I'm not going to do any thing. Protest sheets are at AMA Hq. Get one for each engine and fill out completely. End of worry. Next. Hey, all Cox .049's measure at least .051. Same ending! "Who starts these wild stories?"

The guy who argued because his kid's $\frac{1}{2}$ A speed ship weighed $\frac{1}{2}$ oz. more on our scales than at home. After making him put on the prop, we weighed it at 4.54 instead of 5 oz. He went away happy. Then called AMA Hq. to tell them we gave him a hard time. What if these guys were flying for money?

Note to the two-line fly-natics, 12 airplanes pulled apart during pull-testing. Eleven were two-wire set-ups. This ought to prove something.

Proto ships get farther from original rules each year. How about making protos look like airplanes instead of Hellrazors-with-wheels?

Frye and Roselle set an Open C record of 197.07 with their own piped .65, a beautiful hunk of engine. One look at the plumbing is worth the price of the ticket. They use a centrifugal needle valve to meter in more fuel as needed.

Speed ships are getting larger. Someone figured out that a wing is more than just a line guide. A's are about B size, and B's almost C size. Some C ships look almost like Proto wings.

Things to ponder. If they increase the size of the C lines any more, we won't be able

to reel them up. Can't you see everyone going to contests with a 70' piece of spouting on his car to carry the line? Like the Roto-rooter man with a dead snake.

One guy is going to run fuel through the line on his C ship. He is drilling his line to make it hollow to pump the fuel through. He's having trouble. Drills out about 35 feet, and the drill twists off.

By next year everybody should understand the AMA rule book they are sent. It took one guy four tries to get his AMA number put on. Too small, wrong wing.

Lots of people try to hold a speed model together with two little bolts. We made them put a third bolt in the tail and many complained. Said it isn't in the book. But we didn't have one airplane come off the wire this year. Hope our "Extra Rules" helped. This back bolt cuts down a lot of tail vibration and can make an airplane go faster.

Luke Roy, my able-bodied helper, was a member of the H&R Speed team from years gone by. Works at the Navy base where they sink those atomic subs. Quite a guy. Spent a day in my shop on his way to the Nats. Biggest disappointment was when he found out cucumbers came from pickles. Did a great job at the NATS regardless.

Speed equipment is available from George Aldrich. Has one-line and two-line parts. A beautiful geared Mono-line imported from West Germany.

Charlie Legg's .049 $\frac{1}{2}$ A speed ship had the pipe wrapped with plastic tape. Must have had a heat problem. He turned top time in $\frac{1}{2}$ A, a record. But like last year, couldn't get it to do it again for a record back-up flight.

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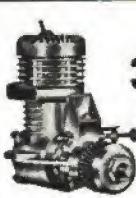


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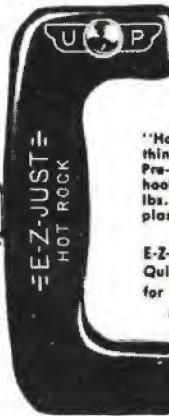
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Saucer

Continued from page 13

neutral (flat) position. Take care over this connecting up, as accurately lined-up controls make for really sweet and easy flying. Add a small weight to the starboard edge of the disc as shown. Hold in place with several layers of tissue doped on. Finally dope and finish your Saucer as detailed on the plan, and bolt the engine in position.

Flying: Before that eagerly anticipated first flight, balance your flying saucer carefully. Tie a length of thread to a pin, and push the pin into the body at the balance point shown on the plan. Your model must balance level. Slight nose-heaviness does not matter, but tail heaviness must be avoided. It is unlikely that you will need any weight at the rear, but with varying engine weights you will most likely need a little additional weight in the nose. This can be achieved in two ways: Simply by adding some sheet lead (only a little will be needed) under the engine mount and block C, or by cutting a false firewall from plywood (around $\frac{1}{4}$ " to $\frac{1}{2}$ " thick) and positioning it between the engine and its mount. This way you move the engine further forward and achieve correct balance without the necessity of adding extra weight. Fig. 8 explains this simple and very neat method of balancing. Take your choice, but either way, do make sure your Saucer balances on the balance point. You'll be glad when you take off on that test-flight!

Wing-overs and loops are possible with Saucer after you are acquainted. So good luck and happy circulating. And choose soft grass to fly over.

Mustang

Continued from page 39

fuselages by making a vertical cut with a razor saw just at the rear of the exhaust stacks. After the nose sections have been removed, the remainder of the fuselage halves should part, allowing easy access to the P-51 interior for any additional detailing you wish to do in the cockpit area. A good phantom drawing of the P-51A on page 65 of the Vol. 2, No. 1 issue of Air Classics will provide further information. Accompanying that drawing is an excellent photograph helpful for shaping the nose and belly contours. When you have finished with the cockpit sides, paint the interior zinc-chromate green, then paint the "black boxes" and throttle quadrant.

Cement the rear fuselage halves together, then cement the Hurricane nose to the P-51B fuselage, aligning it carefully so that the top line matches the fuselage top line, and the join lines match top and bottom. A close look at the plans will reveal that the Hurricane nose terminates in a diameter slightly smaller than the P-51A. To bring this up to proper size, cut a disc of .010" plasticard sheet using the rear section of the P-51B spinner as a template. Cement this disc to the front of the Hurricane nose section, centering it in the process.

When this disc has dried enough to handle, build up the nose contours with putty, also fairing the joint area between fuselage and nose sections. This assembly should be allowed to dry out for at least 24 hours, since the nose area will be subjected to a good deal of working when the nose scoop and exhausts are added. When this is thoroughly dry, wet-sand the nose area with number 500 sandpaper, working carefully and frequently consulting the plans and references.

After you are satisfied with the nose contours, the intake scoop is added. Since this intake scoop is a very prominent identifying feature of the P-51A, it was made as a separate piece fitted into a rectangular cut-out in the upper nose. (Fig. I) The scoop it-



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self is made from $\frac{1}{16}$ "-thick plasticard cut $\frac{1}{8}$ " wide and $\frac{7}{8}$ " long. Using a small flat file, cut a notch at a 45-degree angle at the front of the scoop so that, when viewed head-on, it's shaped like an upside down "U." Cut a small rectangle of thin plastic and cement it to the bottom of the scoop front, and trim. This will close in the scoop and give it the correct open appearance.

A rectangular cutout in the upper nose will accept the scoop. (Fig. 1) Measure back $\frac{1}{8}$ " from the nose and carefully drill a series of $\frac{1}{16}$ "-diameter holes for $\frac{3}{16}$ " on a line centered on the fuselage top. Drill these holes as closely as possible, then use a small needle file to complete the cutout in a rectangular shape to match the intake scoop. While your drill is handy, cut out the openings for the exhaust stacks using the same method. Consult the plans for location. Now fit the intake scoop into the cutout and run a small bead of putty around it.

Your next task is to reduce the depth of the under-belly scoop. Make cuts with a razor saw along the broken horizontal lines as shown in Fig. 2 and discard the shaded area. Also cut the "lip" at the front and sand square. Remove the protrusions representing the exit scoops. Cement the thinned down scoop to the belly and use putty to blend it into the fuselage.

Cement parts 14 and 15 (propeller and rear spinner) together and remove the prop blades. Smooth the spinner as necessary, then mark the new positions for the three-bladed prop of the P-51A and drill a $\frac{1}{16}$ "-diameter hole $\frac{1}{16}$ " deep at each position. Separate the Hurricane propeller blades and shorten the tips by 4 mm. Reshape the ends of the blades with file and sandpaper and cement these into the previously drilled holes in the spinner, making sure the "pitch" of the blades is properly set.

Now wet-sand the putty-filled areas around the carburetor intake and belly

scoop to blend these into the fuselage. Progress in blending these areas should be checked by applying a primer either by brush or spray. This way any imperfections can be found early in the construction process when they are more easily corrected.

A cutout should be made for the exit scoop at the bottom rear of the belly scoop. The position of this is shown in Fig. 3. There will already be an opening at this position resulting from our previous work on the scoop, so it is really only necessary to enlarge this to the proper size with a flat file. Make a small exit scoop as shown in Fig. 3 to fit snugly into the opening, then set this part aside for now.

The wings can be joined to the fuselage. However, some thinning down of the lower wing center-section, where the wing fits between the fuselage and belly scoop, will

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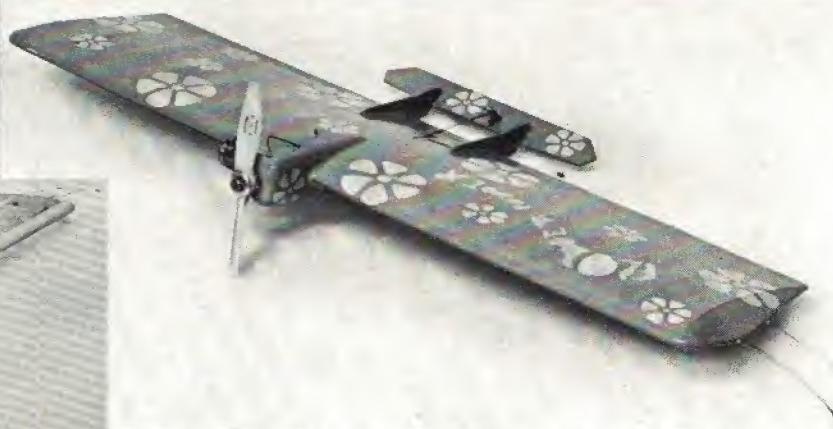
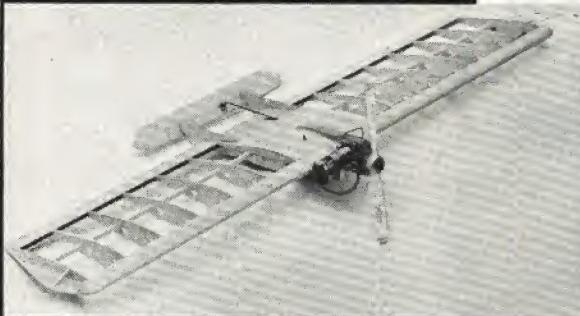
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be necessary before this can be done. This is so, because we have reduced the clearance in the process of reducing the belly-scoop depth. After the wing-to-fuselage fit is satisfactory, cement them together and putty the joints.

The horizontal stabilizers now are attached. This assembly should dry out overnight. Make sure you block up the horizontal stabilizers to prevent droop as they dry.

Next, finish all work inside the cockpit and carefully cement the canopy in place. On our model, the canopy was blended into the fuselage contours by thinning body putty with lacquer thinner and flowing this carefully with a brush at the cockpit-fuselage interface. After this dries, a small piece of sandpaper was used to smooth this down. If you are careful, this can be done without scratching the clear canopy. Wet sand the wing-fuselage and horizontal stabilizer-fuselage joints. While on the subject of sanding, it should be noted that all raised panel lines were removed in the interest of scale appearance.

As mentioned earlier in the article, hypodermic needles were used to simulate the four wing-mounted machine guns. The holes for these can be made now by drilling into the dab of putty inside the wings. Cut the hypodermic needle into $\frac{1}{2}$ " sections and fit them into the wings, recessing them slightly from the leading edge.

At this point you are ready to apply the finish to the basic airframe. Since our model was airbrushed, the canopy was masked before painting. The basic finish applied to the P-51A, as used by the Army Air Corps, was olive-drab above and neutral-gray below. The special theater markings applied to Colonel Cochran's aircraft consisted of five white diagonal bands encircling the rear fuselage, partially obscuring the serial numbers; four white horizontal bands, and a vertical "I" on the vertical tail surfaces.

The forward section of the spinner and wing tips also were white. All striping on our model was masked and sprayed, but could be done with individual decal strips painted white. While the paintwork on the basic airframe is drying, the remaining sub-assemblies can be painted.

The prop was attached by gluing a piece of round stock into the nose, allowing enough protruding to press fit the spinner onto it. This method does not allow your friends to spin the prop, but it does permit easy removal for transporting the model. Exhaust stacks were given a coat of Pactra copper, then dulled and dirtied by overspraying with a mixture of gray-black. The underbelly exit scoop is finished neutral-gray and positioned partially open.

The landing gear goes on without modification as well as the pitot tube. Note that the main gear inner doors were left up, as

shown in some photos, for a cleaner appearance. The fuselage-mounted D/F loop was left until now, mainly for ease of applying the fuselage stripes. Make the mount for this from a piece of sprue, sanded to shape. Then form the loop from soft wire around a paintbrush handle and mount as shown on the plan.

National markings are the new Letra-Set decals. Serial numbers are Micro Scale, and were applied first over the fuselage bands, then the "obscured" portions were cut and removed.

The final touch was the antenna, made from thin nylon thread inserted into No. 80 drilled holes in the fuselage, and leading edge of the vertical tail. With a little extra effort and parts from two kits, an accurate model of this important warplane is well within the capabilities of the experienced modeler.

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Penni Helicopter

Continued from page 27

lose the pieces. Drill a hole in the 3/16 round piece for the tail-rotor shaft. Carve or sand a slight lifting airfoil shape into the tail rotor blades and glue them onto the 3/16 round hub piece at about 20 degrees to the plane of rotation. This is a lefthand prop, because it is pulling the tail to the right when the bottom end is going aft, (rotation as shown on the drawing). Again, stick a piece of straight wire in the tail rotor hub and twirl it between your fingers slowly, to see if the blade angles are equal and that the blades track or run true without a wobble. Make adjustments while the glue is drying, then add a little more glue to make sure.

Glue a little block of $\frac{1}{8}$ sq. balsa to the right side of the tail boom where the tail-rotor shaft is to go. Drill through for the tail-rotor shaft and glue a washer on each side for bearings as you did for the main rotor shaft. After the glue is dry, take a piece of music wire the same size as the tail rotor shaft and clean out the hole so the tail rotor turns easily.

Now cut a piece of music wire for the tail rotor shaft, 1" long, and bend $\frac{1}{8}$ " of the end at a right angle. Push it through the tail rotor hub, sinking the bent end partly into the hub. Glue that end and also glue a washer on the other side. Assemble the tail rotor on to the tail boom; stick the shaft through the hole, put on a glass bead or very small washer, lubricate, add a $\frac{1}{8}$ sq. washer, then the tail rotor pulley.

Enough wire should be sticking thru to bend $\frac{1}{8}$ " of it over by the two-pliers method without wrecking the pulley. Then slide the pulley out against the bent-over end, cement the wire on both sides of the pulley and slide the $\frac{1}{8}$ sq. washer against the fresh cement on the pulley. Blow on the tail rotor to make sure it spins freely, and that the tail rotor pulley runs true. Balance the tail rotor by adding a little Titebond cement to the lighter blade tip.

Main rotor: Cut out the blade blanks, soak them in water and tape them to a metal, cardboard or glass cylinder 2 to 3" in diameter. Leading edges should be parallel to the axis of the cylinder. Lay a piece of cardboard over the blades and wrap tightly with rubber or string. The cardboard may not let the balsa dry as fast, but it prevents the string from creasing the balsa.

Lay out the hub, cut to shape, carve the top sides of the ends to fit the underside of the blades, and drill out the oval center hole with sharpened end of 5/16 tubing. Carve and sand the blades to a nice undercambered airfoil, using the can or tube they were formed on as an aid in holding them. Cement the blades to the hub, using a light line $\frac{1}{4}$ " back of the leading edge to sight across, to make sure the blades are directly opposite each other. Balance the blades on a knife edge crosswise at the center of the hub, either sanding on the heavy blade or adding a little Titebond to the tip of the light blade.

Cut a $\frac{1}{2}$ " long piece of 9/32 aluminum tubing and drill two holes through it at right angles to each other, and at right angles to the centerline of the tube. These 1/32 holes are 3/32 from the end of the tube. Cut and bend the two L-shaped feathering pins from 1/32 music wire and force the short end down through the blade into the hub, so that the long end projects about 1/16 into the oval hole in the hub. Note that these pins are on the centerline of the hub but that the blade leading edges are swept five degrees forward of the centerline of the hub. This is important, especially if you want to lock out the flapping bearing and fly it as a "hingeless" rotor.

Now lift off the feathering pins, slip a small washer over each one and replace them with the 9/32 aluminum tube in posi-

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tion. Cement the feathering pins to the hub. Cut a piece of 1/16 brass tubing just short enough to fit crosswise in the 9/32 tubing. Solder the brass tubing in the eye of the rotor shaft, centered up and perpendicular to the shaft.

Cut a piece of 1/32 music wire 5/16 long and assemble the rotor to the shaft. If the feathering pins project too far into the center of the 9/32 tube and hit the eye of the rotor shaft, file them off a little. Of course, there should not be too much solder on the tube and eye. A small drop of cement on each end of the 5/16-long music wire, where

it sticks through the aluminum tube, holds it in place.

Bend the stabilizer bar and cement it, less weights, to the bottom of the rotor hub. Make the two weights of equal size from $\frac{3}{32}$ resin-core solder or just use Du-Bro Dura-collars with 1/16 bore. If you want to be neat put a bushing of 1/16 aluminum tubing in each collar so it fits the stabilizer bar better. Slip the weights on the ends of the bar and see if it balances. Move one weight in toward the hub a little if necessary. Cement or tighten in position.

One thing hasn't been mentioned yet —

those leading edge tip weights made of 1/16 dia. solder. First, see if they are necessary. My own blades, made from 1/32 balsa, were very flexible, would not track properly, and had to have the weights. Put on your four strands of Pirelli rubber (never mind the tail rotor yet), wind up to a single row of knots, and see if the rotor spins true, or if one blade rides higher than the other. (I blacken one blade tip with magic marker so I can see which one is high.)

Whichever blade is high, bend up the



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stabilizer bar which comes before that blade. Also, if necessary, bend down the bar which comes before the low blade. If you can't get them to track, or if they are very sensitive to a small amount of bending of bar, then add the tip weights, being careful to keep the blades balanced spanwise.

Last, tie the tail rotor belt (button thread) in position fairly tight. The tightness is not necessary to keep it from slipping, but to keep it from climbing off the pulleys while hand-winding. Use a square knot and cement it after you have it tight enough. Work the cement in with your fingers and remove any excess.

Lubricating the rubber with purchased lubricant (or a 50-50 mixture of glycerine and tincture of green soap) gets more power out of the rubber and allows more turns to be put in.

If you want to build the quickie hub, make one long feathering pin instead of the two L-shaped pins. Put two washers in the center of this, push the bent-down ends into the hub, and cement it there. Push the washers out to where they touch the balsa and cement them there. Now, the diamond-shaped eye at the top end of the rotor shaft should just take up the space between the washers when it is assembled and in driving position.

Flying: The CG of the model should come under the center of the rotor. When you launch the model, let go of the rotor first, then a second later release the fuselage. If you want it to rise straight up launch it level. If you want it to fly forward, tilt it forward about 10 degrees. If the tail-rotor thrust is too great for the torque of the main rotor (turns left while hovering) cut a little area off the tail rotor blade tips. If it turns right while hovering, increase the tail rotor blade angle, after making sure that the belt is not slipping.

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The Caprice

Continued from page 35

ful colors? No! Please, no! Let's try something simple for a change.

Every trim line is a basic straight line. How about colors? It was interesting to note that of the seven planes in the final fly-off at the 1969 Masters Tournament in Atlanta, all but one of them had some color combination of red, white, and blue. The one hold-out (old "Orange-Trash"), by Phil Kraft, used blue trim lines on orange anyway. (Orange, by the way, is a highly visible color.) All the aforementioned planes had pleasing straight-forward color schemes.

Three of them used stars as an integral part of the trim design. None of this is to say that there aren't lots of better looking designs around the country. What we are saying is simply this: Certain basic color schemes and designs are preferred by many flyers because of visibility in the air, good detail looks on the ground, and the use of certain design-schemes as the flyer's mark.

On this model, which we now call a Caprice since the identity of the Citron is disappearing, close consideration was given to such criteria, as well as how to best compliment the basic white and red colors of the Lanier kit. On inspection one would note the top deck and fin are red, top half of the original fuselage is white, bottom red. The red and blue regular MonoKote complements the Lanier white and red and was used throughout in color trimming.

Preparation of the model is very important. But first prepare your workbench by clearing off all objects which might ding or dent the foam wing and plastic fuselage. Spread out on your bench the matted paper wrapping that came with your Lanier kit. It will keep the plane looking nice during the rough handling of trimming. Wipe down the entire model with alcohol or Prepsol (a commercial auto paint-shop item for

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cleaning car bodies before painting) to remove grease and oils. If you are using the regular MonoKote, be careful to avoid having to lift it from the surface after contact, and don't stretch it. If trouble develops, see if you can cut and lap it to fit.

When cutting the MonoKote, use a long straight-edge and single-sided razor blade. Mark the plane in pencil showing the edges of each trim line before sticking the material to the plane. Stick a small corner of the MonoKote carefully lined up with the pencil lines and work the piece down along the lines.

When all the trim pieces are in place, stars, lines, designs, etc., you must seal the edges of the MonoKote by painting a thin strip of clear Hobbypoxy along the lines. Don't paint the whole plane with Hobbypoxy, as the clear has a slight yellow pigment which will eventually show up. This coloring is to prevent ultraviolet light from getting through. You won't notice the color if the paint is applied sparingly along just the edges of the MonoKote.

After several days setting and hardening, you can again handle your beauty. Finish the plane off with a coat of spray or paste wax. One secret of keeping a good finish on a model of this type is a good wax coat between the fuel residue and the surface.

I am sure you can modify and adapt any part of your Lanier plane to suit your preferences. I hope the above description of Caprice gives you some basic idea of methods, and on what has been found useful and practical. In short, I like my Caprice because it's a great flyer, designed by some pretty accomplished pilots, but also because it has those special features that are mine alone.

Undone I

Continued from page 21

dry enough to work, add corner strips and bottom sheeting between F5 and tail post.

If you don't mind the stab in your way while working on the rest of the fuse, you can build it now and glue it in place so it'll be square and true with the fuse. Temporarily glue a piece of $\frac{1}{8} \times 2 \times 3\frac{1}{2}$ " across the wing saddle between F3 and F4 and between F4 and F5 to maintain alignment during balance of construction. Now add F2 and T.E. stock in tank section.

When dry, remove from bench and add F4T and F9T, noting that F4T goes aft of F4 and F9T goes aft of F9. Temporarily glue a piece of $\frac{1}{4}$ " sq. between F3 and top of F4T just below the $\frac{1}{4} \times \frac{1}{4}$ stringer notch to maintain alignment while adding stringers. Now add $\frac{1}{4}$ " sq. top stringer gluing to F4T only. (Do not cut off excess length.) Put a rubber band around fuse and stringer at front and back and adjust position to obtain appropriate curve shown on plans. Now add F5T through F8T, but don't glue yet. When satisfied with fit, glue in place, noting that F5T goes forward of lower former, fit F10 and glue in place.

If you've been puzzled over the missing notches in the top formers, it's not that I'm too lazy to lay 'em out; it's just that I've never been able to cut perfect formers yet.

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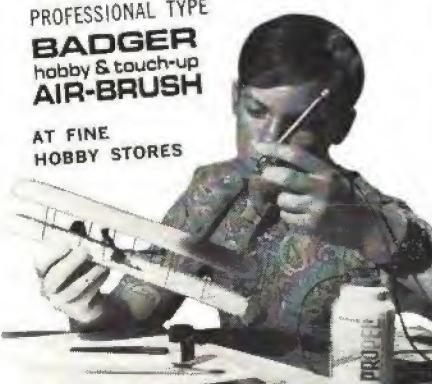
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strip of $\frac{1}{8}$ " sq. spruce or hard balsa in place, picking up the marks on F4T. Stick a pin in F4T on both sides of strip. Tuck the aft end of the strip under the rubber band by F9T. Now adjust strip position at each former to obtain a smooth curve when sighting aft from the front of fuse. Mark the formers, remove strip and notch $\frac{1}{8} \times \frac{1}{4}$ " deep. (Do not notch F9T.) Add stringer and glue in place with butt joint at F9T. Tuck front end of stringer under rubber band at front of fuse. Continue on same side until all four stringers have been fitted in place. Now take a narrow strip of bond paper and wrap it around the stringers at F5T and mark stringer spacing on paper. Flip the paper over to the other side of F5T and transfer marks to edge of former. Repeat this for the remaining formers. You can make a quick check with the $\frac{1}{8}$ " sq. strip before you cut the notches. The whole process takes longer to describe than to do, but nothing spoils the looks of an airplane more than wavy zigzag stringers.

The $3/32 \times 1"$ filler pieces between stringers are in lieu of another former and necessary to maintain stringer contour. After they're dry, trim all stringers flush to F4T. The fillers just aft of F4T aren't mandatory, yet provide a smooth transition from stringer to former when covering is applied.

Add the engine bearers and nylon nose-gear bearings. Fit the engine and install blind nuts in bearers. Drill F2 for throttle rod. Glue in block under tank section and all nose fairing blocks. Coat oil drain groove with epoxy, or as an alternative, insert a piece of $\frac{1}{4}$ " dia. aluminum tubing. Carefully mark fairing blocks and trim front end to fit plywood nose ring. (Try this: Drill a hole in a piece of scrap motor bearer stock, bolt it on like a prop. Trim the fairing blocks to clear it by $\frac{1}{8}$ ". Use a fly cutter with a removable $\frac{1}{4}$ " diameter pilot drill and set the diameter to $2\frac{1}{2}$ ". Remove the pilot drill.

Clamp the cutter onto the crankshaft and rotate the engine one full turn. This makes a perfect reference mark to sand the fairing blocks and align the plywood ring.) Glue ring in place, remove engine, and add F1.

If you object to carving up all that balsa for the cabin, you can use a foam block or molded fiberglass. But be sure to plank the top of the fuse between F3 and F4 to carry the fuselage torsion loads over the wing cutout.

Trim triangle stock to size and glue in place between F3 and F4T making sure they provide a flat surface. Cut hatch cover to fit between F2A and F4T. Add remaining blocks between F3 and F4T, spot gluing in center of blocks only, so they'll be easier to separate later. Now carve and sand to final shape. Split the blocks and remove excess material until approximately $\frac{1}{4}$ " wall thickness is left. Then glue permanently in place. Trim nose fairing blocks to clear carb, needle valve and throttle arm.

Wing: Assuming you've obtained the cores from your favorite source, start by making the cutouts for the aileron bellcranks and landing gear mounts. Mark the cores so you don't end up with two left halves. Install landing gear mounts with epoxy.

Sheet top of wing and add trailing edge. When dry, sand trailing edge to shape, then sheet the bottom. Before putting adhesive on bottom side of core, place $\frac{1}{2}$ " wide strips of masking tape around edge of bellcrank cutout to simplify removing access hatch later. Trim excess sheet from leading edge, sand flat and epoxy leading edge strip and tip blocks in place. When dry, carve to shape and rough sand entire panel. Carefully lay out access hatch and remove by cutting just through the balsa skin, gently prying it loose from the foam core. Save the part you removed. You'll reinstall it later.

If you don't think you can find the exact location of the core cutout, cut a 1" square

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out of the middle of where you think it is and take it from there. Lay the wing half on the bench upside down and mark the entry point for the aileron rod at the center section. Take two pieces of scrap motor mount stock and lay them on the bench in line with the aileron rod axis. Put one next to the center section, and the other about 12" away.

The next step requires a good eye—and a steady hand. Heat the end of a length of $\frac{1}{8}$ " dia. piano wire until it's dull red. Remove from heat; wait about five seconds, then place wire on the hardwood blocks and push hot end into core. You may have to re-heat the wire several times before you get through to the bellcrank cutouts. This makes approximately a $\frac{1}{2}$ " dia. hole. Do the same for the other wing half. Then join the wing halves with masking tape. Install bellcrank platform and bellcranks. Carefully measure and bend bellcrank tie rod.

Separate wing halves and insert rod to check fit. When satisfactory, join wing halves with epoxy and tape to hold alignment until epoxy cures. Sand joint and coat wood with a 2" wide band of Ambroid, scraping off excess. When dry to the touch, add second coat and cover with $1\frac{1}{2}$ " wide pinking tape, forcing cement up through the fabric. This is all you need—no glass, no resin, no spars or joiners. When dry, make servo cutout and glue servo platform in place.

Trace the aileron and aileron cutout and make cardboard templates. Mark aileron location on wing and temporarily install aileron horns. Cut hole for pushrod, using the hot wire again. Cut and fit pushrods. Remove horns and cut ailerons loose. Add spars and closing rib to wing and ailerons. Make servo cutout and install servo. Make slots for hinges and temporarily install ailerons and pushrods. Swing ailerons through full travel and clear any interferences that

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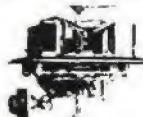
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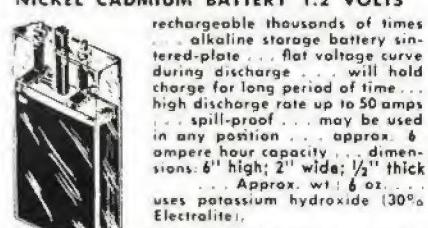


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occur. This is your last chance to work on the belleranks and pushrods, so don't rush the fit check.

Now glue the access hatches in place and finish sanding entire wing. Fit the wing to fuselage and install W1, dowels and drill for screws at trailing edge. The 1/32" ply saddle can be added now, but leave the leather fillets off until after covering. I have yet to have a wing saddle fit the wing on the first try.

Assuming that the horizontal is square and true with the fuselage, put the wing in place and shim if necessary to line up with the horizontal. Now mark and remove high spots as necessary, being careful not to lose the wing incidence relationship.

Epoxy the wing dowels and W1 in place. When dry, add W2 and drill and tap for hold down bolts. With the wing bolted in place, slip a strip of No. 50 grit garnet paper between the wing and fuse. Sand fuselage until there's only a slight drag on the paper. This will remove just enough material to fit the 1/32" plywood saddle. Cut the plywood in 3/4" wide strips with the outer ply grain running spanwise. Glue in place with approximately 1/8" overhang on inside of fuse. Bolt wing on and tape ply to wing if necessary to hold proper curve until glue dries.

Now comes probably the most tedious part of the construction — the bottom wing fillet. I can't suggest an easy way other than carve until it fits. Don't skip the two dowels for the hold down bolts as they help to stabilize the bolts. I started out with No. 4-40 x 1 1/2" bolts. After several hundred flights and a few touch 'n crunch limbo passes they got sloppy, so they were opened up to No. 6-32 and are doing fine now.

Finish: The original models are covered with one layer of GM silkspan and a standard butyrate dope finish. If yours looks like it's coming out heavy, the only solution is MonoKote as we're already down to the minimum thickness on the balsa wood.

If you decide to go the dope and silkspan route, the fuselage sides can be covered in one piece provided you run the grain vertically. If you cover the entire model with one layer of silkspan, it only takes two coats of sanding sealer over the paper to prepare for the base color coat.

Flying: Except for a small amount of incidence in the wing, the first two models were set up with "zero everything" and have not required any changes or trim. To me, the Undone I feels comfortable when trimmed to require a slight but conscious back pressure on the elevator with a full tank of fuel.

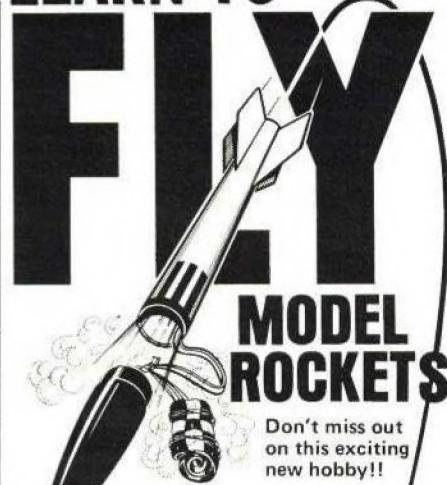
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In the air, control response is pretty rapid and you may find yourself doing too much "piloting" at first. This characteristic is intentional and was achieved in part by concentrating as much of the non-structural weight as possible near the intersection of the pitch/yaw axis. It's a pleasure though to achieve consistent spin and snap roll recovery by just neutralizing the controls.

For honking around or a little impromptu pylon racing the ship will tolerate sloppy flying up to a point but if you are at all serious about the pattern, take your time to line up the wings for a level entry in all maneuvers. Crosswind loops require the most concentration but in most cases holding a small amount of aileron throughout the loop is more effective than corrections during the loop.

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part throttle where you start the flare about 5 ft. high and control the touch-down with power reduction.

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You Said It

Continued from page 7

Bob, your wording indicates you are interested in something more than mere altitude attempts, etc. under FAI rules. We do suggest you contact the Technical Director, Academy of Model Aeronautics, 1039 Vermont Ave. NW, Washington, D.C. 20005 — Publisher.



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